FORMER LANDFILL LF-024
RECORD OF DECISION

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

DRAFT
DECEMBER 1996

PLATTSBURGH AIR FORCE BASE
INSTALLATION RESTORATION PROGRAM

PREPARED BY:
URS GREINER, INC.

J:\35291\wp\LF024.ROD/ta(jm)(cp)
12-27-96:11:50

TABLE OF CONTENTS

		Page No.
DECLARATION FOR THE RECORD OF DECISION		1
1.0	SITE NAME, LOCATION, AND DESCRIPTION	3
2.0	LAND USE AND RESPONSE HISTORY	8
3.0	COMMUNITY PARTICIPATION	8
4.0	SCOPE AND ROLE OF RESPONSE ACTION	8
5.0	SUMMARY OF SITE CONTAMINATION	9
5.1	Contaminant Pathways	9
5.2	Soil/Fill Contamination	9
5.3	Surface Water/Run-off and Sediment Contamination	12
5.4	Groundwater Contamination	12
6.0	SUMMARY OF SITE RISKS	12
6.1	Human Health Risk Assessment	12
6.2	Ecological Risk Assessment	16
7.0	DEVELOPMENT OF REMEDIAL ALTERNATIVE	18
7.1	Selection of The Presumptive Remedy	18
7.2	Remedial Action Objectives	20
7.3	Development of the Remedial Alternative	20
8.0	COMPARATIVE ANALYSIS OF ALTERNATIVES SUMMARY	22
9.0	THE SELECTED REMEDY	25
10.0	STATUTORY DETERMINATIONS	26
10.1	The Selected Remedy is Protective of Human Health and the Environment	26
10.2	The Selected Remedy Attains ARARs	26
10.3	Other Criteria, Advisories, or Guidances to be Considered for This Remedial Action	27
10.4	Cost-Effectiveness	27
10.5	Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable	28
10.6	The Selected Remedy Does Not Satisfy the Preference for Treatment Which Permanently and Significantly Reduces the Toxicity, Mobility, or Volume of the Hazardous Substances as a Principal Element	28
11.0	DOCUMENTATION OF NO SIGNIFICANT CHANGES	29
12.0	STATE ROLE	29

LIST OF TABLES

Table No.		Following Page No.
1	Character of Soil/Fill Contamination	11
2	Character of Surface Water Run-off and Leachate Seeps	13
3	Character of Groundwater Contamination	14
4	Chemicals of Potential Concern Summary Table	15
5	Cancer Risks and Hazard Indices for Multiple Pathways	17
6	Evaluation Criteria	23

LIST OF FIGURES

Figure No.		
1	Vicinity Location Map	3
2	Location of LF-024	4
3	Site Features	5
4	Site Conceptual Model	10
5	Presumptive Remedy Decision Framework	19

LIST OF PHOTOGRAPHS

Photograph No.		Following Page
1	View from the north central perimeter of LF-024 toward the southeast showing the generally good cover of grasses and small trees on the upper landfill surface	6
2	Photo of an area of sparsely vegetated sandy soil near the center of the landfill	6
3	View from southeast to northwest along the southern sideslope of LF-024 (just north of MW-4) showing a cover of small to medium size trees	7
4	View from the southeast to northwest along the toe of the southern sideslope showing exposed construction/demolition and shop debris	7

REFERENCES 30

GLOSSARY 32

LIST OF APPENDICES

APPENDIX A Chemicals Detected in Environmental Media at LF-024

APPENDIX B Declaration of Concurrence

APPENDIX C Public Meeting Transcripts

APPENDIX D Responsiveness Summary

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Plattsburgh Air Force Base (AFB)
Former Landfill LF-024
Plattsburgh, New York

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents a selected remedial action for soil at site LF-024 on Plattsburgh AFB in Plattsburgh, New York. It has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for this site, a copy of which is located at the Information Repository at the Feinburg Library on the campus of the State University of New York at Plattsburgh.

The remedy has been selected by the US Air Force (USAF) and the US Environmental Protection Agency (USEPA) with the concurrence of the New York State Department of Environmental Conservation (NYSDEC) pursuant to the Federal Facilities Agreement among the parties under Section 117(a) of CERCLA, dated July 10, 1991.

ASSESSMENT OF THE SITE

Hazardous substances present in fill and soil at LF-024, if not addressed by implementing the response action selected in this ROD, may present a potential endangerment to human health.

DESCRIPTION OF THE REMEDY

This action addresses the principal threat posed by LF-024 by preventing endangerment to human health, through containment of the landfill to minimize exposure to contaminants in the soil and waste. The proposed source control remedy includes a re-establishment and upgrade of the native soil cap over the landfill; institutional controls to restrict site development, maintenance to protect the integrity of the cap, restrictions preventing the use of groundwater as a potable supply source on, and immediately downgradient of the site; periodic groundwater monitoring for 30 years; site reviews to be conducted every five years; and development of a post-closure plan specifying inspection, maintenance, and monitoring programs to be conducted over 30 years.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state Applicable or Relevant and Appropriate Requirements to the source control remedial action, and is cost-effective. The remedy is based on the presumptive remedy approach developed by the USEPA for landfill sites. Under this presumptive remedy approach, treatment is considered impracticable and consequently, the remedy does not satisfy statutory preference for treatment as a principal element of remediation.

Because this remedy could result in hazardous substances remaining on site, the USAF, USEPA, and NYSDEC will conduct site reviews every five years to ensure that the source control remedy continues to provide adequate protection of human health and the environment.

Signature (USEPA, Regional Administrator)	Date
Signature (Director, Air Force Base Conversion Agency	Date

1.0 SITE NAME, LOCATION AND DESCRIPTION

Plattsburgh AFB is located in Clinton County in northeastern New York State, bordered on the north by the City of Plattsburgh, on the east by Lake Champlain, and on the north and south by the Saranac and Salmon Rivers. It lies approximately 26 miles south of the Canadian border and 167 miles north of Albany. (Figure 1). As part of the USAF's IRP, Plattsburgh AFB initiated activities to identify, evaluate, and restore identified hazardous waste sites. The IRP at Plattsburgh AFB is being implemented according to a Federal Facilities Agreement (Docket No.: II-CERCLA-FFA-10201) signed between the USAF, USEPA, and NYSDEC on September 12, 1991. Plattsburgh AFB was placed on the National Priorities List on November 21, 1989.

Plattsburgh AFB was closed on September 30, 1995 and its reuse is being administered by the Air Force Base Conversion Agency in conjunction with the Plattsburgh Airbase Redevelopment Corporation (PARC). Land use for the southwestern section of the base (including the area of LF-024), has been designated as either open space with light industrial use (Final Comprehensive Reuse Plan, September 1995), or as mixed aviation/industrial use with open space (Final Environmental Impact Statement, October 1995). It is the intent of the Base Conversion Agency to limit use of LF-024 as specified in the Environmental Impact Statement.

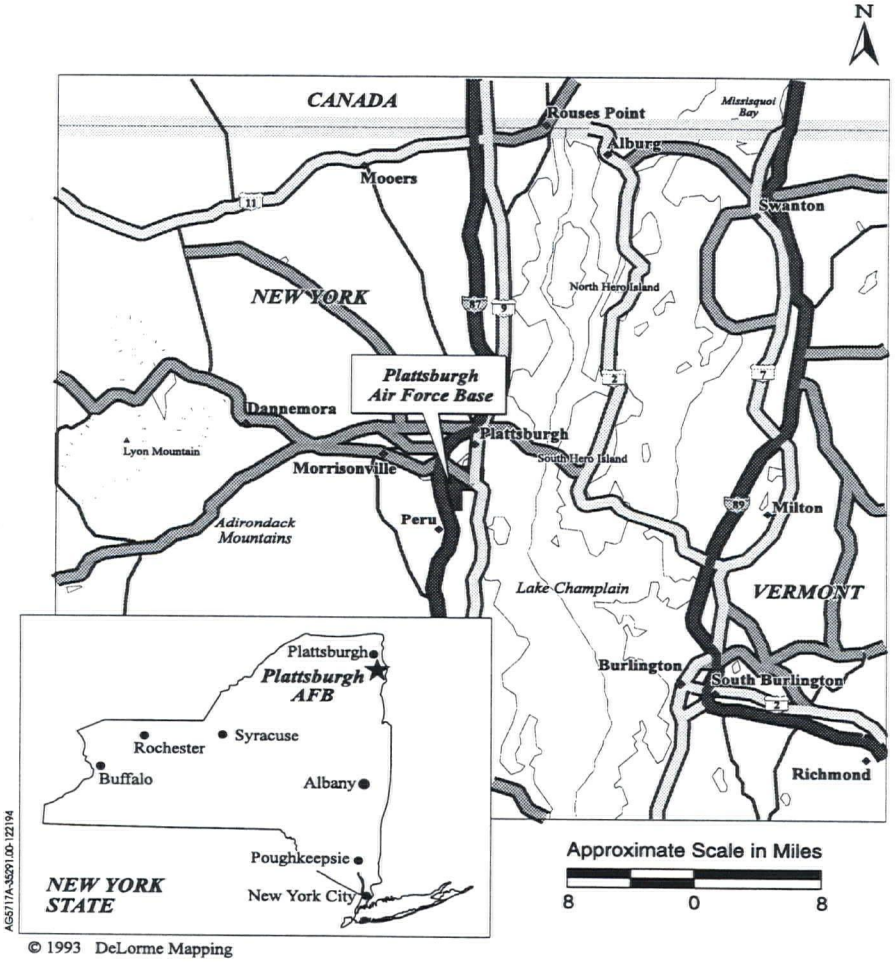


Figure 1: Vicinity Location Map

J:\35291\wp\LF024.ROD/ta(jm)(cp)
12-27-96:11:50

LF-024 is an approximately 1-acre landfill located southwest of the Plattsburgh AFB Flightline, between the southern edge of the Explosive Ordnance Disposal Range and the Salmon River (Figure 2). Pedestrian access to the landfill is limited due to the presence of I-87 to the west, the Salmon River to the south, and woods to the north and east. A four-strand barbed wire fence encompasses LF-024, but is absent along the northern portion of the site (Figure 3). In general, the landfill is in a remote section of the base not frequented by maintenance personnel.

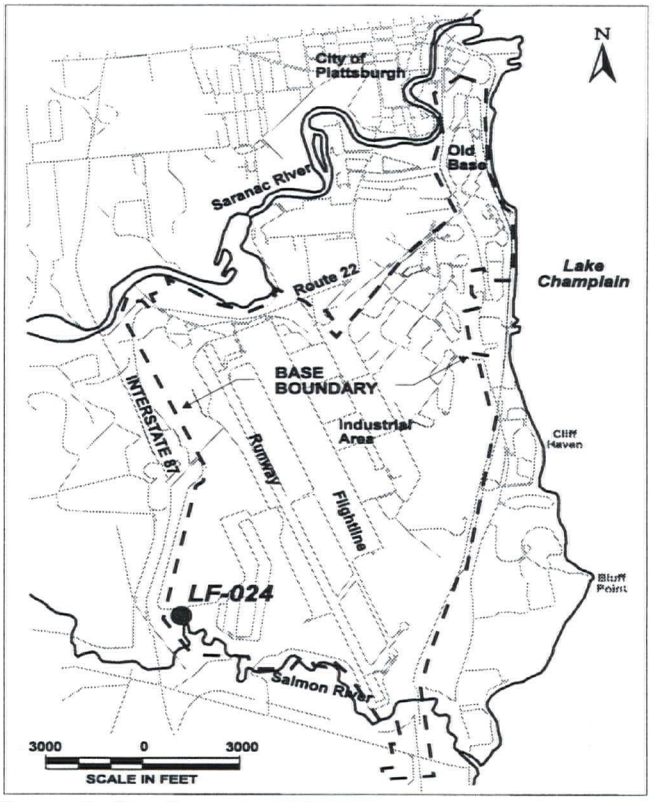
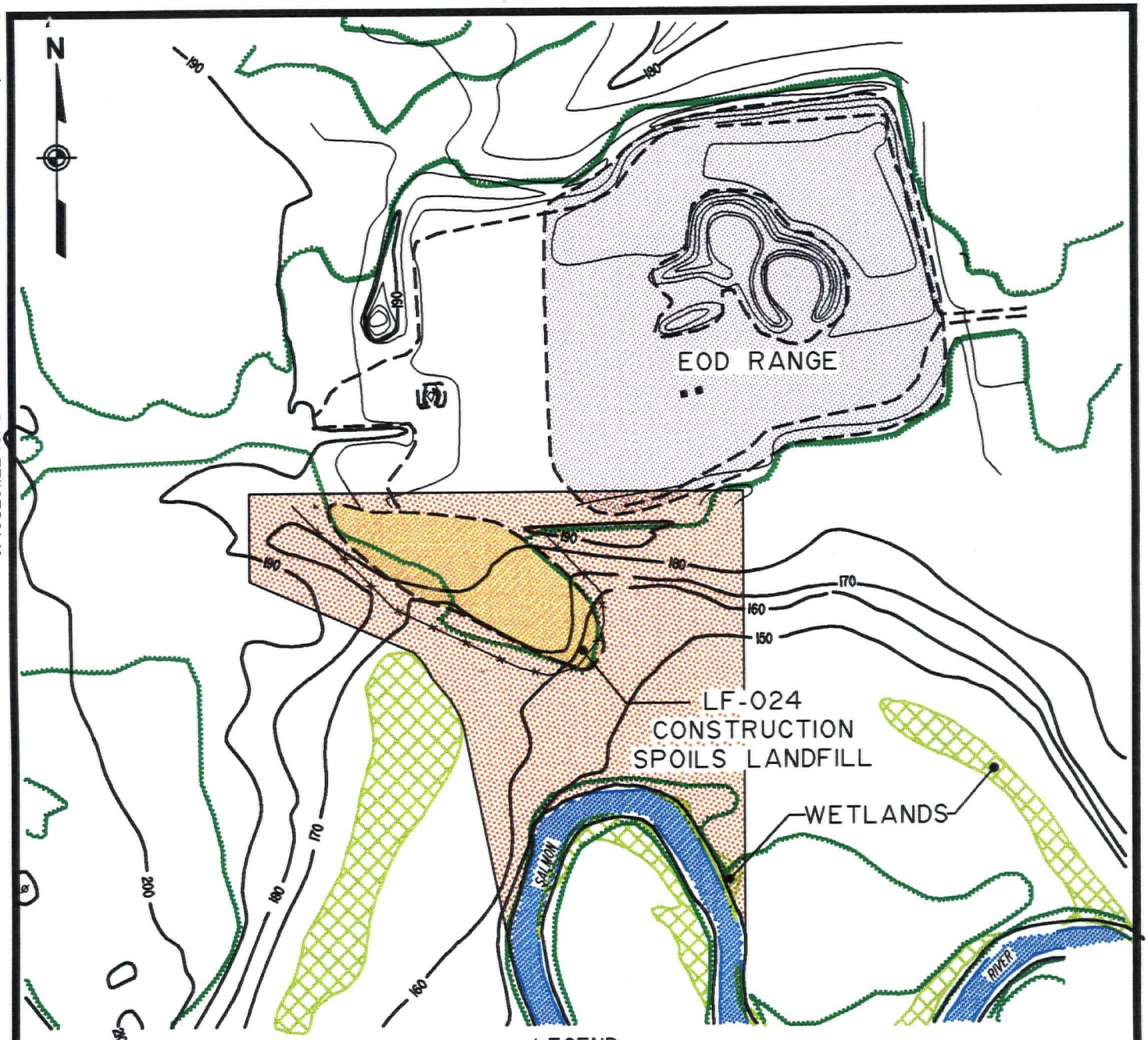
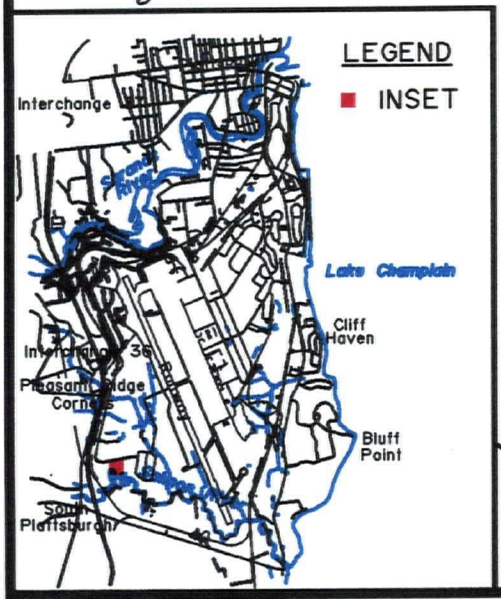


Figure 2: Site Location Map

The site is a flat-topped mound with steep sides covered by grass and surrounded by a ring of woods and brush (Photos 1 and 2). The southern sideslope is tree-covered and debris protrudes from the toe of slope (Photos 3 and 4). Soil surrounding the sandy fill of the landfill consists primarily of silty sand. Beneath the landfill, an upper sand aquifer overlies a clayey silt layer which appears to serve as a confining layer for the underlying bedrock aquifer. Groundwater to lies near the base of the landfill, where it appears to be confined by the underlying clayey silt layer which occurs near or at the base of the landfill. The Salmon River is assumed to serve as a discharge point for local groundwater which flows toward the southeast. Residents in the surrounding areas are located at least 3,000 feet from the site.

J:\35291.22\CAD\LF024\ I=200 11/26/96-4 ETM (COLOR)





LEGEND

- GROUNDWATER USE RESTRICTION AREA
- SALMON RIVER
- APPROXIMATE LIMITS OF LF-024
- APPROXIMATE LIMITS OF SS-026(EOD RANGE)
- FEDERALLY REGULATED WETLAND
- 160 TOPOGRAPHIC CONTOUR (FEET AMSL)
- EDGE OF WOODED AREA
- BARB WIRE FENCE

200 0 200
SCALE IN FEET

AC-7589A

URS CONSULTANTS, INC.

LF-024 PROPOSED PLAN SITE FEATURES

FIGURE 3

PHOTO 1 - View from the north central perimeter of LF-024 toward the southeast showing the generally good cover of grasses and small trees on the upper landfill surface. Larger pine trees in the left background mark the easterly landfill limits.

PHOTO 2 - Although the landfill surface is generally well vegetated, some bare areas are present. This photo shows an area of sparsely vegetated sandy soil near the center of the landfill.

SITE PHOTOS -LF-024

PHOTO 3 - View from southeast to northwest along the southern sideslope of LF-024 (just north of MW-4) showing a cover of small to medium size trees.

PHOTO 4 - View from the southeast to northwest along the toe of the southern sideslope showing exposed construction/demolition and shop debris. This view is typical of the southern and western landfill lower sideslopes.

2.0 LAND USE AND RESPONSE HISTORY

From 1980 to 1986, LF-024 was used for the disposal of construction and demolition debris. Landfill wastes were end dumped, dozer compacted, and covered with sandy soil from surrounding areas. E.C. Jordan Co. reported that oil from transformers may have been disposed of in the landfill (1989); however, polychlorinated biphenyls (PCBs) were not detected in any of the media during subsequent sampling and analysis. During field investigations 18 drums were observed protruding from the fill at the toe of the landfill, many of which were crushed or without lids. Drums that appeared to be intact sounded hollow and were presumed to be empty. Subsequent inspection of the landfill by URS Consultants, Inc. (URS) personnel failed to identify any drums. The USAF has no records indicating that drums were disposed of at the landfill, and it is believed they were used for trash collection.

A site investigation (SI) was performed at LF-024 in the summer of 1993 which included the following: 1) terrain conductivity, magnetometer, and soil gas surveys; 2) excavation of three test pits; 3) installation and sampling of one monitoring well and three well points; and 4) analysis of eleven soil, four sediment, and two surface water samples. Samples were analyzed for the full target compound and target analyte lists. Based on the results of the investigation, the SI report (Malcolm Pirnie 1994) concluded that no further investigation or remedial action was necessary. The database compiled as part of the SI was utilized to quantify potential risk posed to human health (URS 1995a).

3.0 COMMUNITY PARTICIPATION

Plattsburgh AFB has kept the community and other interested parties informed of the activities at LF-024 through informational and public meetings, holding a 30-day public comment period from January 10, 1997 to February 10, 1997 to solicit public input. During this period, the public was invited to review the Proposed Plan, the LF-024 SI and to comment on the remedial alternative being considered. These documents, which comprised the Administrative Record for the LF-024 site, available at the Information Repository located at the Feinberg Library on the campus of the State University of New York at Plattsburgh.

Plattsburgh AFB also hosted a public meeting on January 16, 1997 at the City of Plattsburgh Old Court House to discuss the data gathered at the site, the preferred alternate, and the decision-making process. Immediately after the information presentation, Plattsburgh AFB held a formal Public Hearing to accept comments about the remedial alternative being considered for the LF-024 site. Public comments were recorded and transcribed, and a copy of the transcript was added to the Administrative Record and Information Repository. A response to the comments included in the responsiveness summary is part of this Record of Decision.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses all of the principal threats posed by LF-024 to human health and the environment. The primary threat is risk associated with potential human inhalation of exposed fill material as fugitive dust and physical hazards posed by exposed construction debris. Metals contamination (principally manganese) also occurs in groundwater at the site, although the risks associated with human ingestion were conservatively estimated. There is no impact on surface water or air quality associated with the landfill.

The USAF has utilized the USEPA's containment presumptive remedy for military landfills to help

determine an appropriate remedy for LF-024. Because of the large amount and heterogeneous nature of the material within the landfill, treatment of the fill is not considered practical. Containment, therefore, is considered the appropriate response action, or the presumptive remedy, for LF-024. The remedy recommended in this Plan addresses the principal threats through the removal of exposed debris, capping (containment), monitoring of groundwater, and institutional controls to protect the integrity of the cap and prohibit the use of groundwater as a potable supply source on, and immediately downgradient from the site.

5.0 SUMMARY OF SITE CONTAMINATION

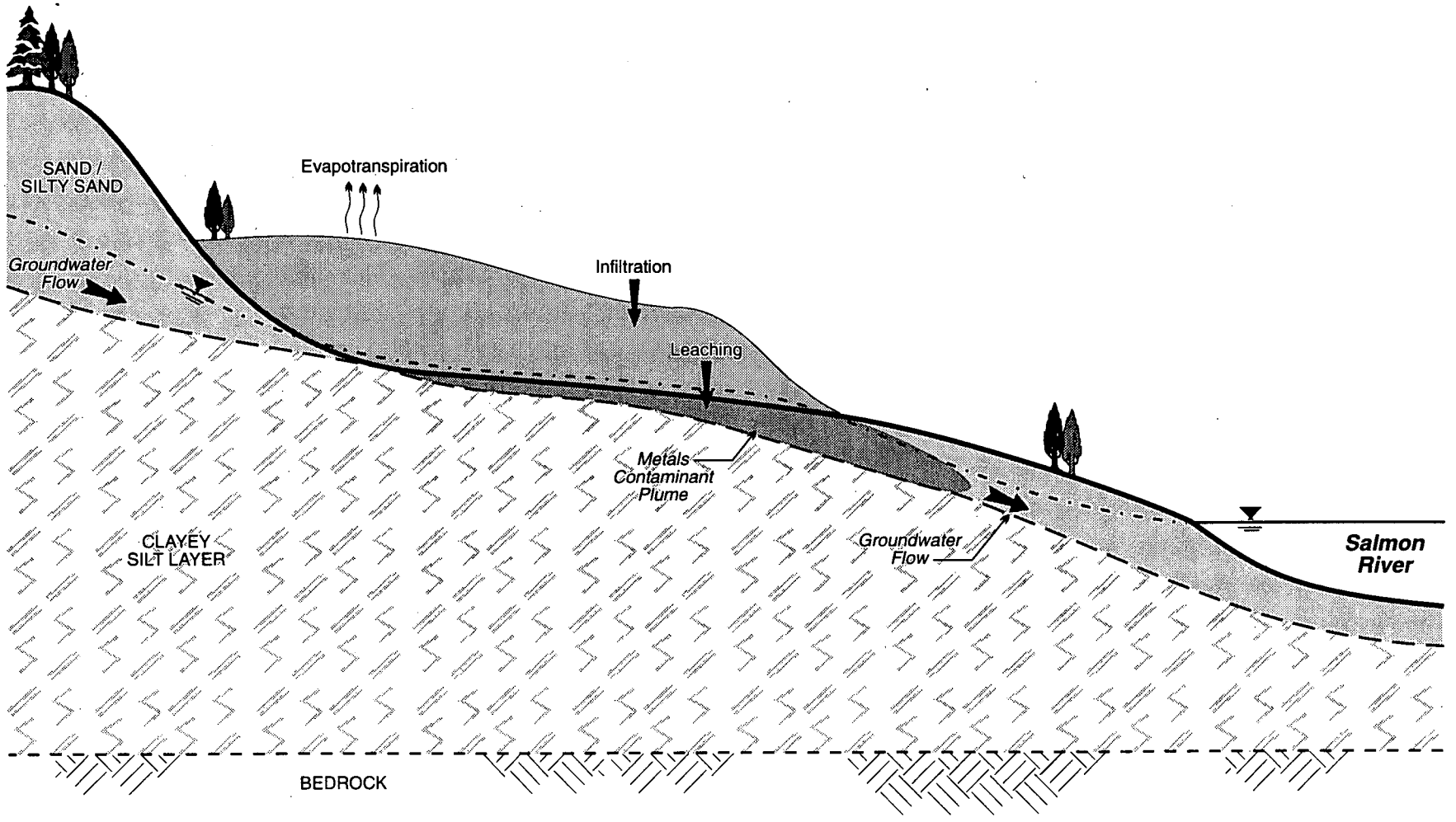
5.1 Containment Pathways

Potential pathways by which containments might leave LF-024 are evaluated based on results of the SI investigation. Air pathways appear to be insignificant because dust generation is limited by the landfill vegetation and soil cover. Volatile organic compounds (VOCs) were detected infrequently and at low concentrations in the soil cover and waste, although elevated levels of metals in the fill do present an inhalation risk where the waste is exposed. Inspection of the landfill indicates that surface run-off from the landfill is negligible with rapid infiltration and evaporation of run-off at the margins of the landfill following heavy rain events. The only potentially significant contaminant migration pathway is vertical leaching of contaminants (i.e., metals) by percolating precipitation, with eventual transport downgradient through groundwater. The site conceptual model is shown in Figure 4. Groundwater flow at the site is shallow and vertically confined by underlying silty sediments which occur at or near the base of the landfill. Contaminant movement downgradient of the site is expected to be limited due to the relative immobility of metals. Chemicals detected in the various environmental media at LF-024 are listed and mapped in Appendix A.

5.2 Soil/Fill Contamination

Eleven soil/fill samples were analyzed during the SI including two subsurface soil samples from the upgradient monitoring well location (depths 0 to 2 feet and 5 to 7 feet), three near surface soil samples obtained from the three downgradient well point locations (1 to 3 feet depth), and six fill samples taken from the three test trenches (two per trench). The six fill samples, which were obtained at depths up to 12 feet, consisted of soil backfill that was mixed with the landfill debris composed of assorted trash, construction materials including corrugated steel, and wood.

In general, organic compounds were detected infrequently in soil/fill samples (Tables A-2, A-3, and A-4). Metals were detected much more frequently, as would be expected, since metals occur naturally in soil, are non-volatile, and do not biodegrade. The level of contamination in soil/fill was evaluated by comparing the detected concentrations to NYSDEC guidelines for soil cleanup (NYSDEC 1992). This comparison is summarized in Table 1. Only one of the nineteen organic compounds (benzo(a)pyrene), and only seven of the nineteen metals (antimony, magnesium, manganese, mercury, potassium, selenium, and thallium) were detected above the guideline values with most exceedances occurring in one sample (see Figures A-2, A-3, and A-4). As shown on Table 1, detection of these analytes above the guideline values was infrequent and primarily associated with the soil used as backfill in the landfill. Low level exceedances of the guideline criteria for nickel and potassium also were found in a near surface soil from a single well point location. In general, the metals contamination observed in the soil/fill samples is likely attributable to the leaching of metals from C&D debris constituting the landfill.



NOT TO SCALE

URS
CONSULTANTS, INC.

SITE CONCEPTUAL MODEL
PLATTSBURGH AIR FORCE BASE LF-024

FIGURE 4

TABLE 1

CONSTRUCTION SPOILS LANDFILL (LF-024)
CHARACTER OF SOIL/FILL CONTAMINATION

Analyte	Guidance Values	Frequency of Detection Above Guidance Value	Detected Maximum Concentration	Source of Guidance Exceedance
Benzo(a)pyrene	61*	1/14	74	Test Trench
Antimony (mg/kg)	12.6 (SB)	1/14	15.4	Test Trench
Magnesium (mg/kg)	3,340 (SB)	2/14	5,459	Test Trench
Manganese (mg/kg)	474 (SB)	3/14	5,455	Test Trench
Mercury	0.1*	1/14	0.17	Test Trench
Nickel (mg/kg)	13*	1/14	28	Near Surface Soil
Potassium (mg/kg)	929 (SB)	3/14	1,160	Test Trench & Near Surface Soil
Selenium (mg/kg)	2*	2/14	655	Test Trench
Thallium (mg/kg)	Non Detection	1/14	104	Test Trench

Organic results reported in µg/kg. Inorganic results reported in mg/kg.

* - NYSDEC Soil Cleanup Objectives and Cleanup Levels, TAGM #4046, November 1992.

SB - Site background value. Based on base-wide background study (URS 1995b).

5.3 Surface Water/Run-off and Sediment Contamination

Surface water and sediment samples were collected at the toe of the landfill where water from run-off was observed to pool after heavy rains. Flowing seeps were not observed during the SI. Since these pools subsequently infiltrate into the underlying soil or evaporate within a few days, the sediment samples can be considered to belong to the soil medium.

The level of contamination from run-off and possible seeps was evaluated by comparing sediment/soil sample analytical data to NYSDEC soil cleanup guidelines (NYSDEC 1992) and the water data to NYSDEC standards for Class A surface water quality (6 NYCRR 703.5 and 703.6). These comparisons are summarized in Table 2 and shown on Figure A-1 (Appendix A). Only two of thirteen organic compounds and only three of seventeen metals detected in sediment (soil) samples exceeded the soil cleanup guidelines (Table A-1). None of the four organic compounds detected and only three of fourteen metals detected exceeded surface water quality standards.

5.4 Groundwater Contamination

Groundwater samples were collected from one upgradient monitoring well and three downgradient well points that were installed using hand-driven well points. Well points were installed during the SI instead of monitoring wells because of difficulties in accessing drilling equipment, and the relative ease of driving well points to monitor shallow groundwater. Since the monitoring well was installed with a sand filter around the well screen (whereas the well points were not), the sample from the well contained less suspended fines which probably accounts for the lower concentration of total metals reported in the monitoring well sample.

Three organic compounds, twenty metals, and cyanide were detected in groundwater. The level of groundwater contamination was evaluated by comparing unfiltered and filtered groundwater samples to NYSDEC standards (6 NYCRR 703.5 and 703.6) and USEPA drinking water standards established by 40 CFR 141 and 143. Results of the comparison are summarized in Table 3. One of the three organic compounds detected and eleven of twenty metals detected in the unfiltered groundwater were present at concentrations above groundwater standards (Table A-5). The concentrations of metals detected in the filtered groundwater samples were considerably less than concentrations reported in the unfiltered samples, reflecting the effect of sample turbidity on the total metals concentration. In the filtered samples, only four metals (iron, manganese, sodium, and thallium) exceeded groundwater standards at one well point location. In the groundwater sample from the upgradient monitoring well, only one metal (an unfiltered iron sample) exceeded groundwater standards. In addition, the concentrations of metals in the upgradient unfiltered sample were significantly lower than concentrations reported in the well point samples (see Figure A-5, Appendix A).

6.0 SUMMARY OF SITE RISKS

A Human Health Risk Assessment was conducted to estimate current and future risks at the site. If no Remedial Action was taken. Chemicals selected for use in evaluation of risks are indicated on Table 4. Compounds were chosen based on frequency of detection, chemical-specific toxicity information, and exceedance of background levels (for inorganics only).

6.1 Human Health Risk Assessment

Five steps are followed in assessing site-related human health risks: *Hazard Identification* - determines

TABLE 2

CONSTRUCTION SPOILS LANDFILL (LF-024)
CHARACTER OF SURFACE WATER RUN-OFF AND LEACHATE SEEPS

SEDIMENT (SOIL) SAMPLES			
Analyte	Guidance Value	Frequency of Detection Above Guidance Value	Detected Maximum Concentration
Acetone	200*	1/4	300
Benzo(a)pyrene	61*	2/4	130
Antimony (mg/kg)	12.6 (SB)	2/4	20.5
Manganese (mg/kg)	474 (SB)	1/4	542
Mercury (mg/kg)	0.1*	1/4	0.18
WATER SAMPLES			
Analyte	Guidance Value**	Frequency of Detection Above Guidance Value	Detected Maximum Concentration
Aluminum (µg/l)	100	1/1	1,960
Iron (µg/l)	300	2/2	15,100
Manganese (µg/l)	300	1/1	1,310

Organic soil results reported in µg/kg. Inorganic soil results reported in mg/kg. Aqueous inorganic results reported in µg/l.

* - NYSDEC Soil Cleanup Objectives and Cleanup Levels, TAGM #4046, November 1992.

SB - Site background value. Based on base-wide background study (URS 1995b).

** - NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, October 1993, For Class A Surface Waters.

TABLE 3

CONSTRUCTION SPOILS LANDFILL (LF-024)
CHARACTER OF GROUNDWATER CONTAMINATION

Analyte	ARAR Value*	Unfiltered Samples		Filtered Samples	
		Frequency of Detection Above Guidance Value	Detected Maximum Concentration	Frequency of Detection Above Guidance Value	Detected Maximum Concentration
2-Methylphenol	1	1/4	2	--	--
Antimony	3	1/4	87.6	0/4	ND
Barium	1,000	1/4	1,790	3/4	195
Beryllium	3	1/4	10.3	0/4	ND
Chromium	50	3/4	338	0/4	ND
Iron	300	3/4	250,000	4/4	82,700
Lead	15**	3/4	85.9	0/4	ND
Magnesium	35,000	3/4	65,600	3/4	33,700
Manganese	300	3/4	15,100	4/4	3,970
Sodium	20,000	1/4	31,300	3/4	28,900
Thallium	4	2/4	9.3	1/4	6.8
Zinc	300	3/4	2,770	4/4	96

All results reported in µg/l.

* - Unless otherwise noted, ARARs are NYSDEC Ambient Water Quality Standards (6 NYCRR 703.5 and 703.6).

** - USEPA Drinking Water Standards 40 CFR 141.

TABLE 4

CONSTRUCTION SPOILS LANDFILL (LF-024)
CHEMICALS OF POTENTIAL CONCERN
SUMMARY TABLE

CHEMICAL	TOXICITY	GROUNDWATER	SURFACE SOIL	SOIL
Methylene Chloride	C	X	X	X
Acetone			X	X
2-Butanone			X	X
Acenaphthylene			X	X
Anthracene			X	X
Benzoic Acid				X
Benzo(a)anthracene	C		X	X
Benzo(a)pyrene	C		X	X
Benzo(b)fluoranthene	C		X	X
Benzo(k)fluoranthene	C		X	X
Benzo(g,h,i)perylene			X	X
bis(2-Ethylhexyl)phthalate	C	X	X	X
Butylbenzylphthalate	C		X	X
Chrysene	C		X	X
Diethylphthalate			X	X
Di-n-butylphthalate			X	X
Fluoranthene			X	X
Fluorene				X
Indeno(1,2,3-cd)pyrene	C		X	X
2-Methylnaphthalene			X	X
2-Methylphenol	C	X		
Naphthalene			X	X
4-Nitroaniline			X	X
Phenanthrene			X	X
Pyrene			X	X
Aluminum		X		
Antimony		X		
Arsenic	C	X	X	X
Barium		X	X	
Beryllium	C	X		
Chromium (III)		X		
Chromium (VI)	C	X		
Cobalt		X		
Cyanide		X		
Lead	C	X		
Manganese		X	X	X
Mercury		X		
Nickel		X		
Selenium				X
Thallium		X		X
Vanadium		X		
Zinc		X		

Notes:

X - Indicates chemical of potential concern

C - Chemical is classified as a carcinogen

the contaminants of concern at the site based on toxicity, frequency of occurrence, and concentration. *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., dermal contact with soil) by which humans potentially are exposed. *Toxicity Assessment* - determines adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. *Uncertainty Analysis* - qualifies the quantitative results of the risk assessment based upon the uncertainty associated with the assumptions made in the analysis. Generally, assumptions made in the assessment process are conservative and yield a reasonable overestimation, rather than an underestimation of risk.

Two human exposure scenarios were evaluated as part of the risk assessment at LF-024.

1) Current Site Conditions - This scenario assumes that the site will remain undeveloped and will be accessible to trespassers. Potentially exposed populations include teenage (ages 13 through 18) and adult (ages 18 and over) trespassers. Potential exposure pathways include dermal contact with and incidental ingestion of soil.

2) Future Site Conditions - This scenario assumes that the site will be remediated and developed for industrial use. Potentially exposed populations include construction workers during site development and industrial workers after site development. Potential exposure pathways include dermal contact with and incidental ingestion of soil, inhalation of fugitive dust, and ingestion of groundwater.

Current federal guidelines for acceptable exposures are expressed as an individual lifetime excess total cancer risk in the range of 10^{-4} to 10^{-6} and a maximum total hazard index (which reflects noncancer risks) equal to one. A hazard index (HI) greater than one indicates a potential for adverse health effects.

The results of the HRA are summarized in Table 5. For current site conditions, cancer risks and hazard indices for potentially exposed populations are below federal guidelines, and risks to human health posed by site contaminants are acceptable. For projected future site conditions, cancer risks fall near the upper end of the acceptable range specified by federal guidelines; however, hazard indices for both construction and maintenance workers (HI = 20 for the inhalation of fugitive dust) and industrial workers (HI = 10 for the ingestion of groundwater) are above federal guidelines. Therefore, there is a potential for adverse health effects. Inhalation of fugitive dust is the pathway of concern for construction workers, and ingestion of groundwater is the pathway of concern for industrial workers. Manganese is the primary constituent driving the unacceptable health risk for both soil and groundwater, with minor contribution from antimony, barium, and vanadium in groundwater.

Groundwater at the site currently is not used as a source of drinking water and is unlikely to be used in the future given the extremely limited yield capacity of the shallow water-bearing zone. The assumptions concerning risks associated with groundwater ingestion are also conservative given that the analysis was performed using total metals data from turbid groundwater samples.

6.2 Ecological Risk Assessment

An ecological risk assessment was not performed for LF-024 since this evaluation was not performed as part of the SI. Also, the ecological risks to potentially impacted terrestrial organisms exposed to

TABLE 5

CONSTRUCTION SPOILS LANDFILL(LF-024)
CANCER RISKS AND HAZARD INDICES FOR MULTIPLE PATHWAYS

EXPOSURE PATHWAY	CURRENT USE				FUTURE USE			
	TRESPASSER				CONSTRUCTION WORKER		INDUSTRIAL WORKER	
	ADULT		TEENAGER					
	CANCER RISK	HAZARD INDEX (CHRONIC)	CANCER RISK	HAZARD INDEX (SUBCHRONIC)	CANCER RISK	HAZARD INDEX (SUBCHRONIC)	CANCER RISK	HAZARD INDEX (CHRONIC)
Dermal contact with soil	NV	NV	NV	NV	NV	NV	NV	NV
Ingestion of soil	8E-07	2E-02	2E-07	2E-02	1E-07	8E-01	5E-07	4E-02
Inhalation of fugitive dust	NA	NA	NA	NA	2E-08	2E+01	NA	NA
Ingestion of groundwater	NA	NA	NA	NA	NA	NA	2E-04	1E+01
TOTAL EXPOSURE CANCER RISK	**8E-07**		**2E-07**		**1E-07**		**2E-04**	
TOTAL EXPOSURE HAZARD INDEX		**2E-02**		**2E-02**		**2E+01**		**1E+01**

ABBREVIATIONS:

NV - No Value (Dermal absorption factors were not available for CPCs.)

NA - Not Applicable

contaminated fill and groundwater are expected to be negligible. Because of the limited area of the landfill (approximately 1 acre), effects on populations of small burrowing mammals (e.g., the meadow mouse) are expected to be minimal and likely to impact only animals with a home range restricted to the fill limits. Contaminants associated with groundwater also are unlikely to affect area ecology significantly, since exposure to groundwater is limited and the metals plume is confined to the area immediately downgradient of the landfill.

7.0 DEVELOPMENT OF REMEDIAL ALTERNATIVE

7.1 Selection of the Presumptive Remedy for Military Landfills

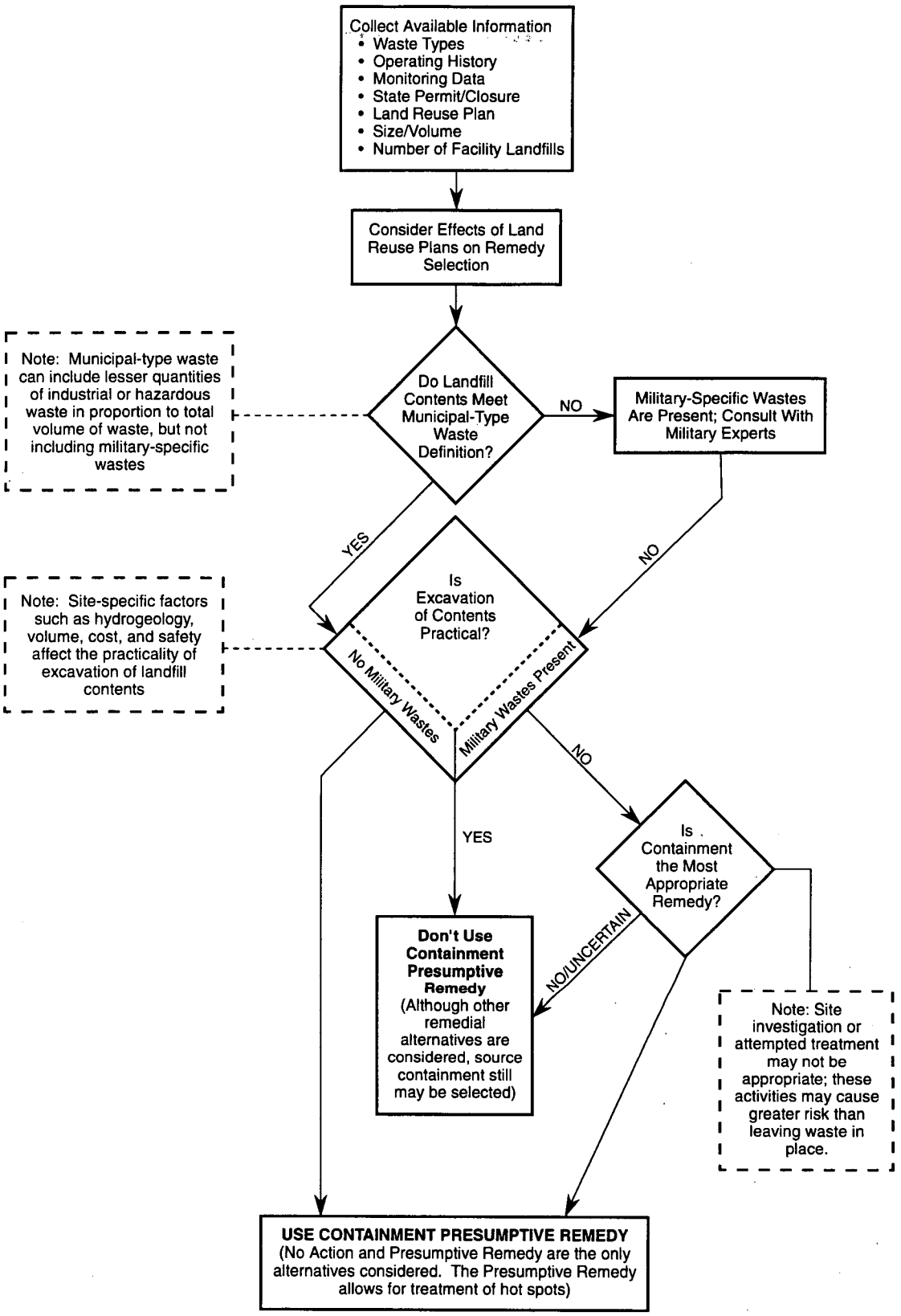
Based on information acquired as a result of past experience with the Superfund Program, the USEPA has developed the presumptive remedy approach to accelerate the remediation process. Presumptive remedies are preferred technologies for common categories of sites (e.g., landfills) that are based on historical patterns of remedy selection and on scientific and engineering evaluations of technology performance. The presumptive remedy approach is a tool for expediting of the remedial process developed by the Office of Federal Facilities Restoration and Reuse.

In keeping with this approach, a remedial investigation/feasibility study (RI/FS) was not prepared for LF-024. Instead, existing site data have been used to perform a risk assessment which provides the basis for the development of a remedial approach that analyzes the various components of the presumptive remedy.

The presumptive remedy for CERCLA landfills meeting the criteria specified by the USEPA's guidance is source containment (USEPA 1996). The decision whether the containment presumptive remedy applies to a specific military landfill is subject to a step-by-step analysis of site-specific conditions with respect to the USEPA guidance criteria. The decision framework for evaluating the applicability of the presumptive remedy is provided in Figure 5. Specific-site circumstances which dictate the appropriateness of this approach include the types of waste present, volume of landfill contents, land use plans, and hydrogeologic and safety considerations. Within the decision framework, the effects of land use are considered first followed by a determination of whether the landfill contents meet the definition of municipal-type waste. Municipal wastes are defined to include household and commercial and industrial solid waste, with less quantities of hazardous waste. Military-specific waste which may pose unique safety risks are afforded special consideration.

Based on information presented in the SI report and summarized in Sections 2.0 and 3.0, the containment presumptive remedy is an appropriate remedy for remediation of LF-024. Although the landfill is relatively small (approximately 1 acre in size), excavation and consolidation would not be preferred given the difficulties associated with the disposal of the waste. Excavation is impractical for several reasons. The excavation and incorporation of the waste within other onsite landfills is not an option since these landfills either have been closed or placement of the waste would impinge on existing wetlands. Excavation and removal of the waste to an offsite landfill also would not be beneficial from a cost perspective. Finally, the contents of the landfill meet the guidance definition for municipal-type waste, and includes a high proportion of nonhazardous C&D debris. The presence of military-type waste in LF-024 has not been documented, and was not observed during SI activities. Levels of contamination associated with the fill indicate a low level of risk commensurate with source containment.

Highlight 4: Decision Framework



AG10994-35291 22-112296-GCM

URS CONSULTANTS, INC.

CERCLA MILITARY LANDFILL
PRESUMPTIVE REMEDY DECISION FRAMEWORK

FIGURE 5

7.2 Remedial Action Objectives

Remedial action objectives are medium-specific goals for protecting human health and the environment, and provide the basis for selection of an appropriate remedial action. Results of the HRA indicate that there is no risk of adverse health effects from direct contact (either incidental ingestion or skin contact) with contaminated soil/fill. However, there is a potential health risk to construction workers from the inhalation of fugitive dust during site remediation operations which include excavation and earth-moving activities. A comparison of analytical results from soil/fill samples with New York State guidelines indicates the onsite soil/fill contamination is minimal, with manganese driving the fugitive dust hazard index. On this basis, the following remedial action objective has been established:

- Prevent construction workers from inhaling contaminated fugitive dust resulting from earth-moving activities during site remediation and post-closure maintenance operations.

The HRA also indicates that there is a potential health risk if a groundwater well is installed on, or immediately downgradient of, the site and utilized for drinking water. At present, there are no drinking water wells on site. The potential risk is attributed primarily to the presence of manganese at elevated concentrations in groundwater, with antimony, barium, and vanadium contributing to a lesser degree to the hazard index. On this basis, the following remedial action objective has been established:

- Prevent human ingestion of contaminated groundwater on and immediately downgradient of the site.

In addition to the potential, chemically-related health-risks described above, the presence of exposed C&D debris which protrudes from the surface of the landfill poses a potential safety hazard. Consequently, the following remedial action objective has been established:

- Eliminate potential physical hazards to onsite workers and maintenance personnel.

7.3 Development of the Remedial Alternative

The containment presumptive remedy consists of five remedial response actions which are evaluated separately with respect to LF-024. The five component parts of the presumptive remedy include:

- Landfill cap
- Source area groundwater control to contain plume
- Leachate collection and treatment
- Landfill gas collection and treatment
- Institutional controls to supplement engineering controls

According to USEPA guidance, response actions for individual sites are required to include only those components that are necessary, based on site-specific conditions. An evaluation of each of the remedial components is provided below.

A landfill cap is a necessary component of the remedial action for LF-024. It is required in conjunction with the removal of exposed surface C&D debris which presents a physical safety hazard and is a remedial action objective for this site. The landfill cap will serve to separate further the fill and debris from surface exposure. The cap will incorporate erosion control measures to reduce the effects of rain and wind;

and will provide a growth medium for the long-term maintenance of the landfill cover.

Groundwater contamination at the site is limited to the presence of metals which were detected in turbid groundwater samples. Groundwater control and leachate collection are unnecessary components of the remediation since the contaminants are relatively immobile in groundwater and would have an insignificant impact on the nearby Salmon River. Preventing the ingestion of groundwater at the site (a major remedial action objective) will be addressed by cap construction which will result in diminished leachate generation, and the use of institutional controls to prohibit the local use of groundwater. Landfill gas collection and treatment is an unnecessary component of the remediation, since air monitoring results indicate that there is no appreciable landfill gas emissions.

Institutional controls are a necessary component for remediation at LF-024 and are required to: (1) restrict groundwater use and limit site development, (2) provide for the continued protection and maintenance of the landfill cap, and (3) provide notice of potential health risks associated with remediation and development of the site.

Specific alternatives for the two remedial components considered appropriate for LF-024 (i.e., landfill cap and institutional controls), are discussed below.

Landfill Cap: Three potential options for the landfill cap include: 1) a double barrier (RCRA-based) cap; 2) a single barrier (NYSDEC Part 360-based) cap and 3) native soil cover (i.e., naturally occurring). Individual components of these caps are described below. Each option was evaluated with respect to effectiveness (i.e., the ability to meet the remedial action objectives and to protect human health and the environment), implementability (both administrative and technical), and cost.

All three landfill caps are expected to be effective. Any of the caps, if properly designed and maintained, would prevent direct contact by humans with onsite soil/fill, gradually diminish leachate generation and groundwater contamination, and reduce risks associated with physical hazards and the inhalation of fugitive dust.

The technical implementability (i.e., constructability) of the three caps is related to the components summarized below:

Double Barrier Cap includes a gas collection, clay layer, flexible membrane liner, sand drainage layer, filter fabric, soil layer for frost protection, topsoil, and vegetative cover.

Single Barrier Cap includes a gas collection layer, a low permeability layer (or flexible membrane liner), a soil layer for frost protection, topsoil, and vegetative cover.

Native Soil Cap includes a soil layer, topsoil, and vegetative cover.

Based on the components required, the double barrier cap and single barrier cap would be more difficult to construct, whereas the native soil cover would be comparatively easier to construct. Both barrier caps would be particularly difficult to construct on LF-024 because a portion of the surface is heavily forested. Complete clearing and grubbing of the site prior to cap construction is undesirable, since the significant vegetation protects the surface against erosion.

Cap costs depend largely on the number of components and total cap thickness. A native soil cover is the least costly landfill cap. An order of magnitude estimate for the construction of a 12-inch native soil cover is $59,000 for this 1-acre site. The construction cost for a single barrier cap (without a gas collection layer) is estimated to be over four times greater than the native soil cover. The construction cost of the double barrier cap is estimated to be significantly (approximately 20 to 40 percent) greater than the single barrier cap. Operations and maintenance (O&M) costs for the double barrier cap are expected to be the highest. O&M costs for a single barrier cap are expected to be lower than the double barrier, but significantly higher than for a native soil cover.

Institutional Controls: Appropriate institutional controls for LF-024 include restrictions that limit site development and protect the integrity of the cap. In addition, institutional controls will be necessary to address remedial action objectives including water use restrictions that prohibit the use of groundwater as a potable water source on and immediately downgradient of the site; and, as a precautionary notice concerning potential inhalation risks during earth-moving activities. These institutional controls will be specified in the ROD and implemented by the PARC which is responsible for management of the property.

Implementation of these remedial measures will require continued groundwater monitoring, including five-year site reviews to evaluate the effectiveness of the remedial measures. These remedial measures and the rationale for their selection are supported by USEPA guidance.

8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES SUMMARY

Nine criteria are utilized for the evaluation of an alternative as specified in the NCP and discussed in detail in the RI/FS guidance (USEPA 1988). These nine criteria are listed and described in Table 6. The evaluation of the recommended remedial alternative at LF-024 with respect to these nine criteria is presented below.

Overall Protection of Human Health and the Environment - The remedial alternative selected for LF-024 will reduce human risk to acceptable levels. The construction of a landfill cap, in conjunction with the removal/realignment of protruding construction debris, will eliminate physical hazards while protecting onsite workers from the possible inhalation of fugitive dust. In addition, the landfill cap effectively will reduce long-term leaching impacts on groundwater quality, reducing risks associated with groundwater ingestion.

The implementation of institutional controls (including deed restrictions on groundwater use, periodic inspection and maintenance requirements, and groundwater monitoring and site reviews) would ensure continued protection. Regular inspection of the cap will ensure that the cap remains effective in meeting the remedial objectives. The groundwater monitoring program will assist in evaluating the adequacy of controls to protect downgradient receptors.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) - In general, exceedances of groundwater ARARs (see Section 2.4.4) are minimal and suspect due to the high turbidity of the groundwater samples. Human health can be protected adequately by preventing groundwater use on and immediately downgradient of the site until such time as groundwater quality is confirmed or leaching effects are sufficiently diminished. Construction of the cap with proper drainage control and continued monitoring will protect against a release of contaminants exceeding ARARs in near-surface soil and fill. It is anticipated that acceptable levels of metals will be obtained in groundwater within the first year of cap construction.

TABLE 6

CONSTRUCTION SPOILS LANDFILL (LF-024)
EVALUATION CRITERIA

Criteria No.	Description
1	Overall Protection of Human Health and the Environment - Protectiveness is the primary requirement of remedial action at hazardous waste sites. Evaluation of this criterion involves an assessment of how an alternative achieves protection over time and how site risks are reduced.
2	Compliance with ARARs - Compliance with ARARs includes compliance with chemical-specific, action-specific, and location-specific requirements.
3	Long-term Effectiveness and Permanence - This criterion requires an assessment of: (a) the magnitude of residual risk after remediation; (b) the adequacy of controls to meet required performance specifications, both initially and into the future; and (c) the reliability of controls from an operational standpoint.
4	Reduction of Toxicity, Mobility, or Volume (TMV) - This criterion addresses the statutory preference, expressed in the Superfund Amendments and Reauthorization Act (SARA), for remedies that employ treatment as a principal element. It includes an assessment of the magnitude, significance, and irreversibility of treatment, as well as an evaluation of the type and quantity of residuals remaining after treatment.
5	Short-term Effectiveness - This criterion includes the short-term impacts of an alternative (i.e., during implementation) upon the surrounding community, onsite workers, and the environment. It also addresses the time required for the alternative to satisfy remedial action objectives.
6	Implementability - Implementability includes many of the practical aspects associated with implementation of the remedial alternative, such as the ability to construct and operate remedial technologies, the reliability of the technologies, ease of undertaking additional remedial actions if necessary, ability to monitor the alternative's effectiveness, availability of required materials and services, permit requirements, and need to coordinate with other agencies.
7	Cost - This quantitative evaluation criterion includes the capital and operation/maintenance costs associated with each alternative, as well as its total present worth.
8	State Acceptance - This criterion evaluates the technical and administrative issues and concerns the State may have regarding an alternative.
9	Community Acceptance - This criterion evaluates the issues and concerns the public may have regarding an alternative.

NYSDEC regulations, namely 6NYCRR Part 360 Solid Waste Management Facilities (effective December 31, 1988), are the most important action-specific ARARs for LF-024. They regulate closure and final design for landfills. The recommended remedial alternative is compliant with these regulations and complies with all action- and location-specific ARARs.

Long-Term Effectiveness and Performance - The remedial action objectives established for LF-024 will be addressed by the containment presumptive remedy. Health risk associated with the future inhalation of fugitive dust and physical hazards related to protruding debris will be eliminated by surface contouring and capping. Risks associated with the ingestion of groundwater will be controlled by implementing institutional controls on groundwater use. In addition, the gradual reduction in groundwater contamination will be achieved by diminished landfill leaching over time.

The site monitoring program and five-year site reviews represent additional institutional controls that will be used to evaluate the effectiveness of remedial measures and, consequently, to protect human health and the environment.

Reduction of Toxicity, Mobility, and Volume (TMV) - A treatment technology to reduce TMV is not included in the alternative. Groundwater contamination at the site is limited to metals which are relatively immobile and would have an insignificant impact on the Salmon River. Health risks associated with the ingestion of metals (primarily manganese) will be controlled by limiting infiltration and landfill leaching, and by restrictions on groundwater use on and immediately downgradient of the landfill.

Short-Term Effectiveness - Construction of the alternative will require some earth-work for site grading. During the construction period including intrusive activities during site development, short-term impacts to workers and the environment is possible via inhalation of fugitive dust. However, these impacts can be mitigated easily by instituting conventional health and safety measures. It is estimated that construction/implementation of remedial measures will require less than one year. The remedial action objectives will be met upon completion of construction and the incorporation of deed restrictions on the use of groundwater.

Implementability - The technologies proposed for the alternative are conventional and are expected to be constructed with little, if any, difficulty. Cap construction and grading in wooded areas is expected to present the greatest difficultly during construction. Materials required for construction (i.e., topsoil and common borrow) are available.

Cost - The capital cost includes the cost of cap construction and implementation of deed restrictions. The capital cost estimate for this alternative is $59,000. O&M costs include annual monitoring, and cap inspection and repair. The estimated annual O&M cost is $6,000. The present worth cost of the annual O&M cost, based on a 30-year period at an interest rate of 6 percent, is $77,000.

State Acceptance - The NYSDEC has provided input during the preparation of the SI and HRA.

Community Acceptance - Community acceptance of the recommended alternative will be evaluated after the public comment period ends and will be documented in the ROD for the site.

In accordance with the NCP, the recommended alternative is protective of human health and the environment, will comply with ARARs within the prescribed time, and is cost effective. The recommended

alternative is not a permanent solution since it does not include treatment. However, it follows the NCP and USEPA guidance which specifies containment as the presumptive remedy for landfills.

9.0 THE SELECTED REMEDY

Plattsburgh AFB has selected for remediation of LF-024 the presumptive remedy designated by the USEPA for military landfills consisting of containment with a native soil cap and institutional controls. USEPA approval and NYSDEC concurrence are expected. The selected remedy is protective of human health and the environment, and is cost effective. The alternative includes the following elements:

Native Soil Cap - A 12-inch native soil cap consisting of naturally occurring soils with a 9-inch layer of inorganic soil, a 3-inch topsoil layer, and a vegetative cover, will be established at LF-024 as a supplement to the existing soil cap. Soil for capping will be chemically analyzed before it is utilized at LF-024. Large trees (i.e., those over 6 inches in diameter) may be left in place during soil cover establishment provided the trees do not interfere with the attainment of the remedial goal or the maintenance of positive surface water run-off and erosion control. Soil layers will be compacted to reduce permeability and the site cap will be constructed to control surface water run-off and control erosion. The soil cover will be inspected on an annual basis with repairs/replacement of the cap as required.

Institutional Controls - Restrictions will be imposed to limit development of any structure on the landfill site which would adversely effect human health and safety. The deed will include appropriate restrictions to prevent any adverse action leading to the deterioration of the landfill cap to include prohibition from installing any wells for drinking water or any other purpose which could result in the use of the underlying groundwater and the prohibition against any excavation of the landfill cap without prior approval of New York State Department of Environmental Conservation. In addition, notice is to be provided concerning potential short-term health risks from inhalation of dust during site construction activities. Area groundwater use will be restricted as shown on Figure 3 and includes the area encompassing the landfill and groundwater pathway between the landfill and the Salmon River.

Monitoring - Long-term groundwater monitoring will be performed and analyzed to evaluate groundwater quality during the post-closure period. Groundwater samples will be collected using a low-flow pump from three shallow downgradient monitoring wells, which will be installed near the respective locations of the SI well points (See Figure A-5 - Appendix A). An additional well will be located 100 feet farther downgradient, between the landfill and the Salmon River to serve as a sentry well to monitor plume containment. A groundwater sample also will be collected from the existing upgradient monitoring well to provide a background comparison. Samples will be collected following well purging and analyzed for total metals (i.e., target analyte list inorganics). Sampling will be conducted semi-annually for the first five-years after the cap is constructed, and annually thereafter. Monitoring results will be reviewed by the USAF, USEPA, and NYSDEC. Detailed instructions for the conduct of the groundwater monitoring program will be included in the site's Operation and Maintenance Plan and implemented as part of the Record of Decision (ROD).

Five-Year Site Review - Every five years, data generated by the monitoring program will be reviewed to evaluate the effectiveness of remedial measures. Modifications to the extent of site monitoring efforts will be recommended at that time.

10.0 STATUTORY DETERMINATIONS

The remedial action selected for implementation at LF-024 is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs, and is cost effective. The selected remedy uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable for this site. However, it does not satisfy the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity, or volume of hazardous substances as a principal element.

10.1 The Selected Remedy is Protective of Human Health and the Environment

The remedy at LF-024 will permanently reduce the potential future risk posed to human health and the environment through engineering controls (i.e., construction of a native soil cap), as well as institutional controls (i.e., restrictions on the future development of the site and the use of groundwater as a potable supply source). The construction of the cap, as well as its inspection every five years and any required repair, will practically eliminate the risks posed by the inhalation of fugitive dust and physical hazards associated with protruding construction debris. Currently, LF-024 poses no unacceptable risk to human health. Carcinogenic risk is less than 1×10^{-6} and the noncarcinogenic hazard index is less than 1.

The site cap will be constructed so that soil layers are compacted to reduce permeability, and to control surface water runoff and erosion. These features will reduce offsite migration of contaminants transported by precipitation and subsequently groundwater. Moreover, institutional controls will prohibit use of groundwater as a water supply; and cap inspection and repair will ensure the integrity of the cap is maintained. Finally, implementation of the selected remedy will not pose unacceptable short-term risks that cannot be mitigated easily by instituting conventional health and safety measures. In addition, no adverse cross-media impacts are expected from the remedy.

10.2 The Selected Remedy Attains ARARs

The remedy will comply with all applicable or relevant and appropriate chemical-, action-, and location-specific requirements (ARARs). These federal and state ARARs are presented below.

Chemical-specific

- *NYSDEC Division of Water, Technical and Operational Guidance Series (TOGS) 1.1.1, Ambient Water Quality Standards and Guidance Values, October 1993* - Establishes standards for public water supplies including groundwater.

- *RCRA Hazardous Waste Toxicity Characteristic Limit, 40 CFR 261* - Establishes standards for soil.

- *6 NYCRR 700-705 Water Quality Regulations* - Establishes standards for groundwater.

- *USEPA Safe Drinking Water Act, National Primary and Secondary Drinking Water Regulations (40 CFR Parts 141 and 143)* - Establishes standards for potable sources.

Action-specific

- *NYSDEC Solid Waste Management Facility Rules 6 NYCRR Part 360 Effective December 31, 1988* - Establishes criteria for solid waste landfills and specifies closure and post-closure procedures

- *NYSDEC Division of Air Resources Regulation (6NYCRR Parts 200-202, 257)* - Establishes regulations applicable to particulate matter (e.g., fugitive dusts) entrained in air during clearing, grading, and cover system construction activities.

- *Clean Air Act (40 CFR Part 50)* - Establishes regulations applicable to particulate matter (e.g., fugitive dusts) entrained in air during clearing, grading, and cover system construction activities.

- *Occupational Safety and Health Administration Regulations (29 CFR Parts 1904, 1910, and 1916)* - Establishes regulations applicable to all work conducted on site.

Location-specific

- *National Environmental Policy Act of 1969 (NEPA) (32 CFR Part 989)* - The Department of the Air Force revised the regulation to update its process for compliance with NEPA. The revision provides policy and guidance for consideration of environmental matters in the Air Force decision-making process.

- *Section 404 of the Clean Water Act and 40 CFR 230* - Protects waters of the United States, including aquatic and wetland habitats.

- *New York State Use and Protection of Waters (6 NYCRR 608)* - Protects streams including Class A, B, and C(T) from disturbances or adverse impacts through a permitting process.

- *New York State Water Quality Classifications (6 NYCRR 701-703)* - Classifies and protects groundwater, streams, and other water bodies.

10.3 Other Criteria, Advisories, or Guidance to be Considered for this Remedial Action

NYSDEC soil TBCs will not be met since treatment is not included in the alternative. However, the NYSDEC concurred with the recommended alternative since TBCs are guidance rather than promulgated standards and the remedy adequately protects human health and the environment. Overall, contaminant levels in groundwater are considered to be minimal; therefore, human health can be protected by prohibiting its use on, and immediately downgradient of the site. Only four metal (iron, manganese, sodium and thallium) were detected at concentrations above NYSDEC groundwater quality standards. Construction of a cap with proper drainage controls and continued monitoring will protect surface water and sediment quality.

10.4 Cost-Effectiveness

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs. In selecting this remedy, the overall effectiveness of each capping alternative was evaluated by assessing three relevant criteria: ability to protect human health and the environment,

implementability, and cost. Including the cap construction and implementation of deed restriction, the capital cost is estimated to be $59,000. O&M costs include groundwater monitoring, and cap inspection and repair. The estimated annual O&M cost is $6,000. The present worth cost of the annual O&M cost, based on a 30-year period at an interest rate of 6 percent, is $77,000.

10.5 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the source control remedial action, and is cost effective. The selected remedy uses permanent solutions and alternative treatment technologies to the extent practicable for this site. The source control remedy was selected by identifying a combination of technical and administrative elements that provides the best balance in the terms of: 1) long-term effectiveness and permanence; 2) reduction of mobility, toxicity, or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost.

The remedy will eliminate the risks associated with inhalation of fugitive dust and groundwater. Monitoring and five-year site reviews will be used to measure its long-term effectiveness in protecting human health and the environment. However, the remedy will not reduce the toxicity, mobility, and volume of contaminated site media. Construction of the remedy will require some earthwork for site grading. During the one-year construction period and during site development, short-term impacts to workers are possible through inhalation of fugitive dust. However, these impacts easily can be avoided by implementing conventional safety precautions.

The remedy is expected to be implemented with little, if any, difficulty. Construction of the cap and grading in heavily-wooded areas will present the greatest difficulty. Materials required for construction (such as topsoil and common borrow) are expected to be available. Regular inspection of the cap will ensure that the cap remains effective in meeting the remedial objective. The monitoring program will help to evaluate the adequacy of controls and to protect downgradient environmental receptors and any future human receptors. The cost includes the cap construction, implementation of deed restriction, and O&M cost.

The selected remedy complies with state regulations governing closure and post-closure of solid waste landfills, and the NYSDEC has had the opportunity to review and comment on all documents procured for LF-024. State and public comments received on the LF-024 Remedial Investigation Report and the Proposed Plan to date have been incorporated into this ROD.

10.6 The Selected Remedy Does Not Satisfy the Preference for Treatment Which Permanently and Significantly Reduces the Toxicity, Mobility, or Volume of the Hazardous Substances as a Principal Element

Because treatment of the principal threats at the site was found to be impracticable, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Treatment technologies were considered during the identification, development, and initial screening of alternatives, but were considered to be infeasible for the LF-024 landfill site. The size of the landfill and the fact that there are no definable onsite hot spots that represent the major sources of contamination preclude a remedy in which contaminants could be excavated and treated effectively.

11.0 DOCUMENTATION OF NO SIGNIFICANT CHANGES

Plattsburgh AFB presented a Proposed Plan for the preferred alternative for remediation of LF-024 in November 1996. The preferred alternative includes:

- Clearing the site
- Establishing a continuous soil cover
- Managing surface water runoff to minimize erosion of the cover and minimize maintenance requirements
- Establishing vegetation to minimize erosion of the final cover and enhance evapotranspiration
- Developing a post-closure plan development to monitor, maintain, and inspect the site
- Monitor groundwater
- Conducting five-year reviews

The chosen remedial action does not differ from the preferred alternative presented in the Proposed Plan.

12.0 STATE ROLE

The NYSDEC, on behalf of the State of New York, has review the various alternatives and has indicated its support for the selected remedy. It also has reviewed the SI and Proposed Plan to determine if the selected remedy complies with applicable or relevant and appropriate New York State environmental laws and regulations. The NYSDEC concurs with the selected remedy for the LF-024. A copy of the declaration of concurrence is attached as Appendix B.

REFERENCES

E. C. Jordan Co. 1989. *Installation Restoration Program, Final Site Inspection Report, Plattsburgh Air Force Base, Plattsburgh, New York.*

New York State Department of Environmental Conservation (NYSDEC). 1994. Bureau of Hazardous Waste Remediation. *Determination of Soil Cleanup Objectives and Cleanup Levels, TAGM #4046.*

_____. 1993. *Ambient Water Quality Standards and Guidance Values, TOGS 1.1.1.* Albany: Division of Water.

PARC. 1995. *Comprehensive Reuse Plan for Plattsburgh Air Force Base.* 15 September (subject to revision).

Radian Corporation. 1985. *Installation Restoration Program, Phase I - Records Search, Plattsburgh Air Force Base, Plattsburgh, New York.*

URS Consultants, Inc. 1994. *Former Landfill (LF-021), Remedial Investigation Report, Plattsburgh Air Base, Installation Restoration Program, Plattsburgh, New York.*

U.S. Environmental Protection Agency (USEPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, October. Cincinnati, OH: USEPA.

_____. 1989a. *Risk Assessment Guidance for Superfund, Vol I: Human Health Evaluation Manual (Part A), Interim Final*, (EPA/540/1-89/002). Cincinnati, OH: USEPA.

_____. 1989b. *Risk Assessment Guidance for Superfund, Vol. II: Environmental Evaluation Manual* (EPA/540/1-89/001). Cincinnati, OH: USEPA.

_____. 1989c. *Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment, Interim Final,* July. Cincinnati, OH: USEPA.

_____. 1990a. *Streamlining the RI/FS for CERCLA Municipal Landfill Sites.* Cincinnati, OH: USEPA

_____. 1990b. "National Oil and Hazardous Substance Pollution Contingency Plan;" 40 CFR Part 300; Washington, D.C. March 8, 1990.

_____. 1991a. *Summary Report on Issues in Ecological Risk Assessment*, EPA/625/3-91-018, Risk Assessment Forum. Cincinnati, OH: USEPA.

_____. 1991b. *Ecological Assessment of Superfund Sites: An Overview*, ECO Update, Vol. 1, No. 2, Publication 934.0-05I. Cincinnati, OH: USEPA.

_____. 1991c. *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfills,* EPA/540/P-91/001. Cincinnati, OH: USEPA.

REFERENCES - Cont'd

_____. 1993. *Presumptive Remedy for CERCLA Municipal Landfill Sites.* Cincinnati, OH: USEPA.

_____. 1996. *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills (Interim Guidance).* EPA/540/F-96/007, April. Washington, D.C.

GLOSSARY

Administrative Record: A file established and maintained in compliance with Section 113(K) of CERCLA, consisting of information upon which the lead agency bases its final decisions on the selection of remedial method(s) for a Superfund site. The Administrative Record is available to the public.

Applicable or Relevant and Appropriate Requirements (ARARs): ARARs include any state or federal statute or regulation that pertains to protection of public health and the environmental in addressing certain site conditions or using a particular remedial technology at a Superfund site. A state law to preserve wetland areas is an example of an ARAR. USEPA must consider whether a remedial alternative meets ARARs as part of the process for selecting a remedial alternative for a Superfund site.

Aquifer: A water-bearing formation or group of formations.

Carcinogenic: Exposure to a particular level of a potential carcinogen may produce cancer.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act requires federal agencies to investigate and remediate abandoned or uncontrolled hazardous waste sites.

Ecological Receptors: Fauna or flora in a given area that could be affected by contaminants in surface soils, surface water, and/or sediment.

Groundwater: Water found beneath the earth's surface that fills pores within materials such as sand, soil, gravel, and cracks in bedrock, and often serves as a source of drinking water.

HDPE: High Density Polyethene, plastic material often used to cover municipal and hazardous waste landfills.

Inorganic Compounds: A class of naturally occurring compounds that includes metals, cyanide, nitrates, sulfates, chlorides, carbonate, bicarbonate, and other oxide complexes.

Installation Restoration Program (IRP): The U.S. Air Force subcomponent of the Defense Environment Restoration Program (DERP) that specifically deals with investigating and remediating sites associated with suspected releases of toxic and hazardous materials from past activities. The DERP was established to clean up hazardous waste disposal and spill sites at Department of Defense facilities nation-wide.

Landfill Cap: A cover system for the landfill.

Leachate: Solution produced by percolating liquid in contact with contaminated matter.

NCP: National Oil and Hazardous Substance Contingency Plan. A federal law governing hazardous substances (40 CFR Part 300, 1990).

National Priorities List: USEPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program.

Noncarcinogenic: Exposure to a particular level of a potential noncarcinogen may produce adverse health effects.

Organic Compounds: Any chemical compounds built on the carbon atom, (i.e., methane, propane, etc.)

PAHs: Polynuclear Aromatic Hydrocarbons, often associated with combustion process and distillation tars.

PCBs: Polychlorinated Biphenyls, formerly used as a lubricant and transformer coolant.

ppb: Parts per billion.

ppm: Parts per million.

RCRA: Resource Conservation and Recovery Act.

Record of Decision (ROD): A public document that explains the remedial alternative to be used at a National Priorities List (NPL) site. The ROD is based on information and technical analysis generated during the Remedial Investigation, and on consideration of the public comments and community concerns received on the Proposed Plan. The ROD includes a Responsiveness Summary of public comments.

Remedial Action: A long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to human health or the environment.

Remedial Alternatives: Options evaluated to address the source and/or migration of contaminants to meet health-based or ecology-based remediation goals.

Remedial Investigation (RI): The Remedial Investigation determines the nature, extent, and composition of contamination at a hazardous waste site, and directs the types of remedial options that are developed in the Feasibility Study.

SACM: Superfund Accelerated Cleanup Model.

SARA: The Superfund Amendments and Reauthorization Act of 1986 amended the 1980 CERCLA. The amendments that re-authorized the federal Superfund which had expired in 1985 and established the preference for remedies that permanently reduce toxicity, volume, or mobility of hazardous constituents.

Sediments: Soil material found in water.

Semivolatile Organic Compounds: (SVOCs) Organic constituents which are generally insoluble in water and are not readily transported in groundwater.

Source: Area at a hazardous waste site from which contamination originates.

Superfund: The trust fund, created by CERCLA out of special taxes, used to investigate and clean up abandoned or uncontrolled hazardous waste sites. Out of this fund USEPA either: (1) pays for site remediation when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work or (2) takes legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of the remediation. Federal facilities are not eligible for Superfund monies.

TBC: Non-promulgated standards "To Be Considered" for consideration as ARARs.

Volatile Organic Compounds: (VOCs) Organic constituents which tend to volatilize or to change from a liquid to a gas form when exposed to the atmosphere. Many VOC's are readily transported in groundwater.

APPENDIX A

CHEMICALS DETECTED IN ENVIRONMENTAL MEDIA AT LF-024

APPENDIX A

CHEMICALS DETECTED IN ENVIRONMENTAL MEDIA AT LF-024

TABLE/FIGURE NUMBER	TITLE
TABLE A-1	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - SUMMARY OF ANALYTES DETECTED IN SEDIMENT SAMPLES
FIGURE A-1	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - CHEMICALS DETECTED IN SURFACE WATER AND SEDIMENT SAMPLES
TABLE A-2	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - SUMMARY OF ANALYTES DETECTED IN NEAR SURFACE SOIL
FIGURE A-2	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - CHEMICALS DETECTED IN NEAR SURFACE SOIL SAMPLES
TABLE A-3	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - SUMMARY OF ANALYTES DETECTED IN FILL SAMPLES TAKEN DURING TEST TRENCHING
FIGURE A-3	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - CHEMICALS DETECTED IN FILL SAMPLES
TABLE A-4	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - SUMMARY OF ANALYTES DETECTED IN SUBSURFACE SOIL SAMPLES
FIGURE A-4	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - CHEMICALS DETECTED IN SUBSURFACE SOIL SAMPLES
TABLE A-5	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - SUMMARY OF ANALYTES DETECTED IN GROUNDWATER
FIGURE A-5	CONSTRUCTION SPOILS LANDFILL (LF-024) SITE INVESTIGATION - CHEMICALS DETECTED IN GROUNDWATER

TABLE A-1

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN THE SEDIMENT SAMPLES

ANALYTE	LEVEL IV		
	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Methylene Chloride	2 / 4	7	10
Acetone	1 / 4	300	300
2-Butanone	2 / 4	22	98
Diethylphthalate	1 / 4	15	15
Phenanthrene	1 / 4	10	10
Di-n-butylphthalate	4 / 4	39	5300
Fluoranthene	2 / 4	10	13
Pyrene	2 / 4	6	6
Butylbenzylphthalate	2 / 4	13	15
bis(2-Ethylhexyl)phthalate	2 / 4	32	43
Benzo(a)pyrene	2 / 4	67	130
Naphthalene	1 / 4	7	7
2-Methylnaphthalene	1 / 4	2	2

All results reported in µg/kg.

Note:

Due to limited areal extent and intermittent subaqueous nature, these samples were used in the HRA to evaluate risks associated with soil.

TABLE A-1 (cont'd)

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN THE SEDIMENT SAMPLES

ANALYTE	LEVEL IV		
	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Aluminum	4 / 4	2450	3490
Antimony	2 / 4	15.3	20.5
Arsenic	1 / 4	3.5	3.5
Barium	4 / 4	25.1	32.1
Beryllium	1 / 4	0.7	0.7
Calcium	4 / 4	2390	3220
Chromium	4 / 4	3.9	6.4
Cobalt	4 / 4	1.6	5.2
Copper	3 / 4	1.4	5.8
Iron	4 / 4	6760	15600
Lead	4 / 4	4.6	11.5
Magnesium	4 / 4	679	1090
Manganese	4 / 4	189	542
Mercury	1 / 4	0.18	0.18
Nickel	1 / 4	8.5	8.5
Potassium	4 / 4	363	588
Vanadium	4 / 4	10.5	12.4
Zinc	4 / 4	16.1	39.1

All results reported in µg/kg.

Note:

Due to limited areal extent and intermittent subaqueous nature, these samples were used in the HRA to evaluate risks associated with soil.

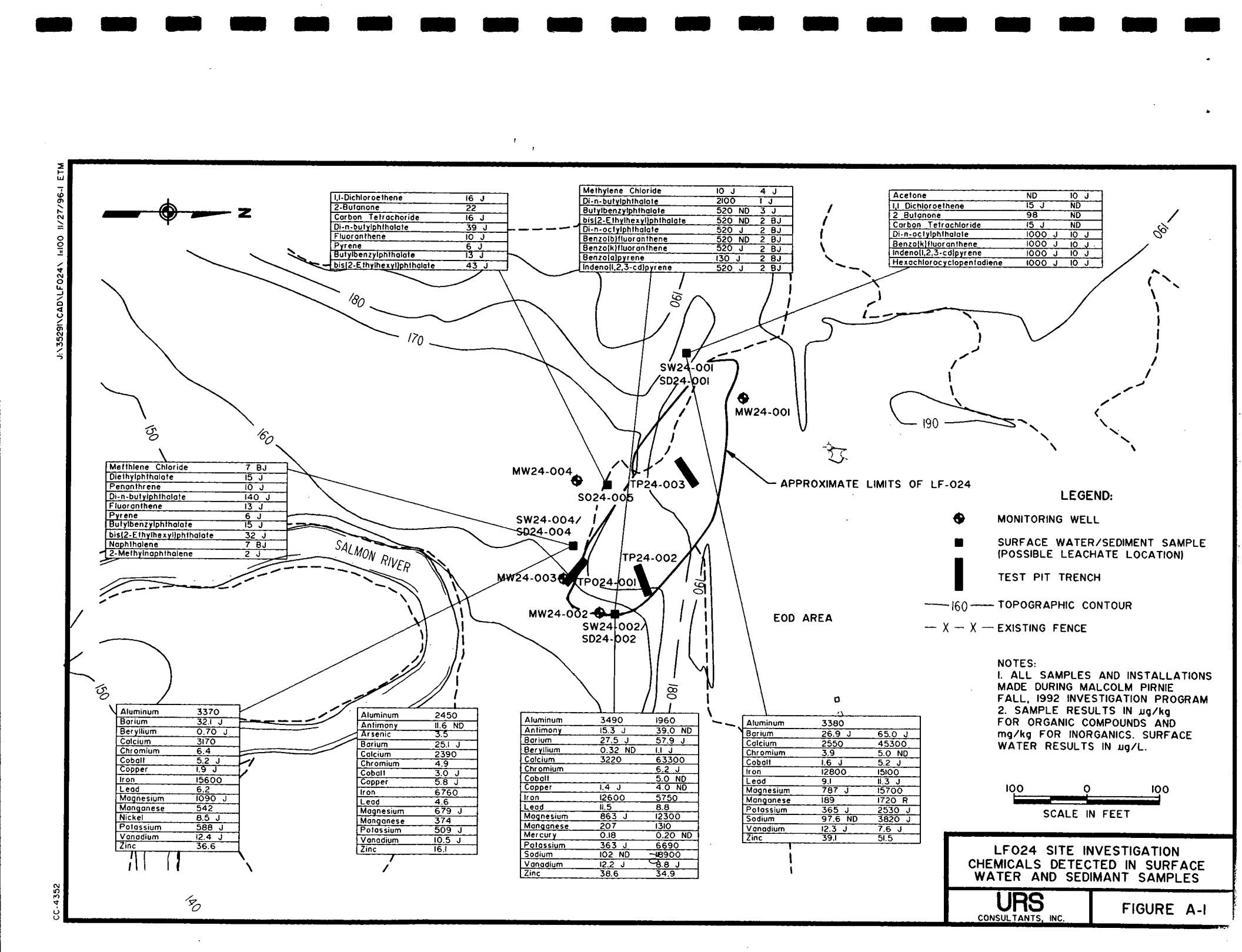

J:\3529N\CAD\LF024\ 1=100 11/27/96-1 ETM
CC-4352
N
1,1-Dichloroethene 16 J
2-Butanone 22
Carbon Tetrachoride 16 J
Di-n-butylphthalate 39 J
Fluoranthene 10 J
Pyrene 6 J
Butylbenzylphthalate 13 J
bis(2-Ethylhexyl)phthalate 43 J
Methylene Chloride 10 J 4 J
Di-n-butylphthalate 2100 1 J
Butylbenzylphthalate 520 ND 3 J
bis(2-Ethylhexyl)phthalate 520 ND 2 BJ
Di-n-octylphthalate 520 J 2 BJ
Benzo(b)fluoranthene 520 ND 2 BJ
Benzo(k)fluoranthene 520 J 2 BJ
Benzo(a)pyrene 130 J 2 BJ
Indeno(1,2,3-cd)pyrene 520 J 2 BJ
Acetone ND 10 J
1,1 Dichloroethene 15 J ND
2 Butanone 98 ND
Carbon Tetrachloride 15 J ND
Di-n-octylphthalate 1000 J 10 J
Benzo(k)fluoranthene 1000 J 10 J
Indeno(1,2,3-cd)pyrene 1000 J 10 J
Hexachlorocyclopentadiene 1000 J 10 J
Methylene Chloride 7 BJ
Diethylphthalate 15 J
Penanthrene 10 J
Di-n-butylphthalate 140 J
Fluoranthene 13 J
Pyrene 6 J
Butylbenzylphthalate 15 J
bis(2-Ethylhexyl)phthalate 32 J
Naphthalene 7 BJ
2-Methylnaphthalene 2 J
Aluminum 3370
Barium 32.1 J
Beryllium 0.70 J
Calcium 3170
Chromium 6.4
Cobalt 5.2 J
Copper 1.9 J
Iron 15600
Lead 6.2
Magnesium 1090 J
Manganese 542
Nickel 8.5 J
Potassium 588 J
Vanadium 12.4 J
Zinc 36.6
Aluminum 2450
Antimony 11.6 ND
Arsenic 3.5
Barium 25.1 J
Calcium 2390
Chromium 4.9
Cobalt 3.0 J
Copper 5.8 J
Iron 6760
Lead 4.6
Magnesium 679 J
Manganese 374
Potassium 509 J
Vanadium 10.5 J
Zinc 16.1
Aluminum 3490 1960
Antimony 15.3 J 39.0 ND
Barium 27.5 J 57.9 J
Beryllium 0.32 ND 1.1 J
Calcium 3220 63300
Chromium 6.2 J
Cobalt 5.0 ND
Copper 1.4 J 4.0 ND
Iron 12600 5750
Lead 11.5 8.8
Magnesium 863 J 12300
Manganese 207 1310
Mercury 0.18 0.20 ND
Potassium 363 J 6690
Sodium 102 ND 48900
Vanadium 12.2 J 8.8 J
Zinc 38.6 34.9
Aluminum 3380
Barium 26.9 J 65.0 J
Calcium 2550 45300
Chromium 3.9 5.0 ND
Cobalt 1.6 J 5.2 J
Iron 12800 15100
Lead 9.1 11.3 J
Magnesium 787 J 15700
Manganese 189 1720 R
Potassium 365 J 2530 J
Sodium 97.6 ND 3820 J
Vanadium 12.3 J 7.6 J
Zinc 39.1 51.5
SW24-001
SD24-001
MW24-001
MW24-004
SO24-005
TP24-003
SW24-004/
SD24-004
TP24-002
MW24-003
TP024-001
MW24-002
SW24-002/
SD24-002
APPROXIMATE LIMITS OF LF-024
EOD AREA
SALMON RIVER
LEGEND:
MONITORING WELL
SURFACE WATER/SEDIMENT SAMPLE (POSSIBLE LEACHATE LOCATION)
TEST PIT TRENCH
160 TOPOGRAPHIC CONTOUR
X X EXISTING FENCE
NOTES:
1. ALL SAMPLES AND INSTALLATIONS MADE DURING MALCOLM PIRNIE FALL, 1992 INVESTIGATION PROGRAM
2. SAMPLE RESULTS IN µg/kg FOR ORGANIC COMPOUNDS AND mg/kg FOR INORGANICS. SURFACE WATER RESULTS IN µg/L.
100 0 100
SCALE IN FEET
LF024 SITE INVESTIGATION
CHEMICALS DETECTED IN SURFACE WATER AND SEDIMANT SAMPLES
URS CONSULTANTS, INC.
FIGURE A-1

TABLE A-2

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN NEAR SURFACE SOIL

ANALYTE	TBC Values*	LEVEL III		
		FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Organic Compounds:				
Acetone	200	2 / 3	2	6
bis(2-Ethylhexyl)phthalate	50,000	3 / 3	21	42
Inorganic Compounds:				
Aluminum	8,510 (SB)	3 / 3	4715	6752
Barium	300	3 / 3	41	120
Calcium	30,200 (SB)	3 / 3	1948	2467
Chromium	19.5 (SB)	3 / 3	7.9	10.7
Iron	36,200 (SB)	3 / 3	13200	15414
Magnesium	3,340 (SB)	3 / 3	1141	1853
Manganese	474 (SB)	3 / 3	307	2481 [a]
Mercury	0.1	1 / 1	0.01	0.01
Nickel	13	1 / 3	28 [a]	28 [a]
Potassium	929 (SB)	1 / 3	1160 [a]	1160 [a]
Vanadium	150	3 / 3	14.3	24.2
Zinc	63.4 (SB)	3 / 3	8.8	13.7

All results reported in µg/kg for organic analytes and in mg/kg for inorganic analytes.

ND - Not Detected.

SB - Soil background value. Based on basewide background study (URS 1995).

Notes:

* - Unless otherwise noted, To Be Considered (TBC) values are NYSDEC Soil Cleanup Objectives and Cleanup Levels, TAGM HWR-94-4046, January 1994. Site Background (SB) values for metals were used when less stringent than the regulatory value. Site Background was based on a basewide background study (URS 1995).

[a] - Exceeds TBC values.

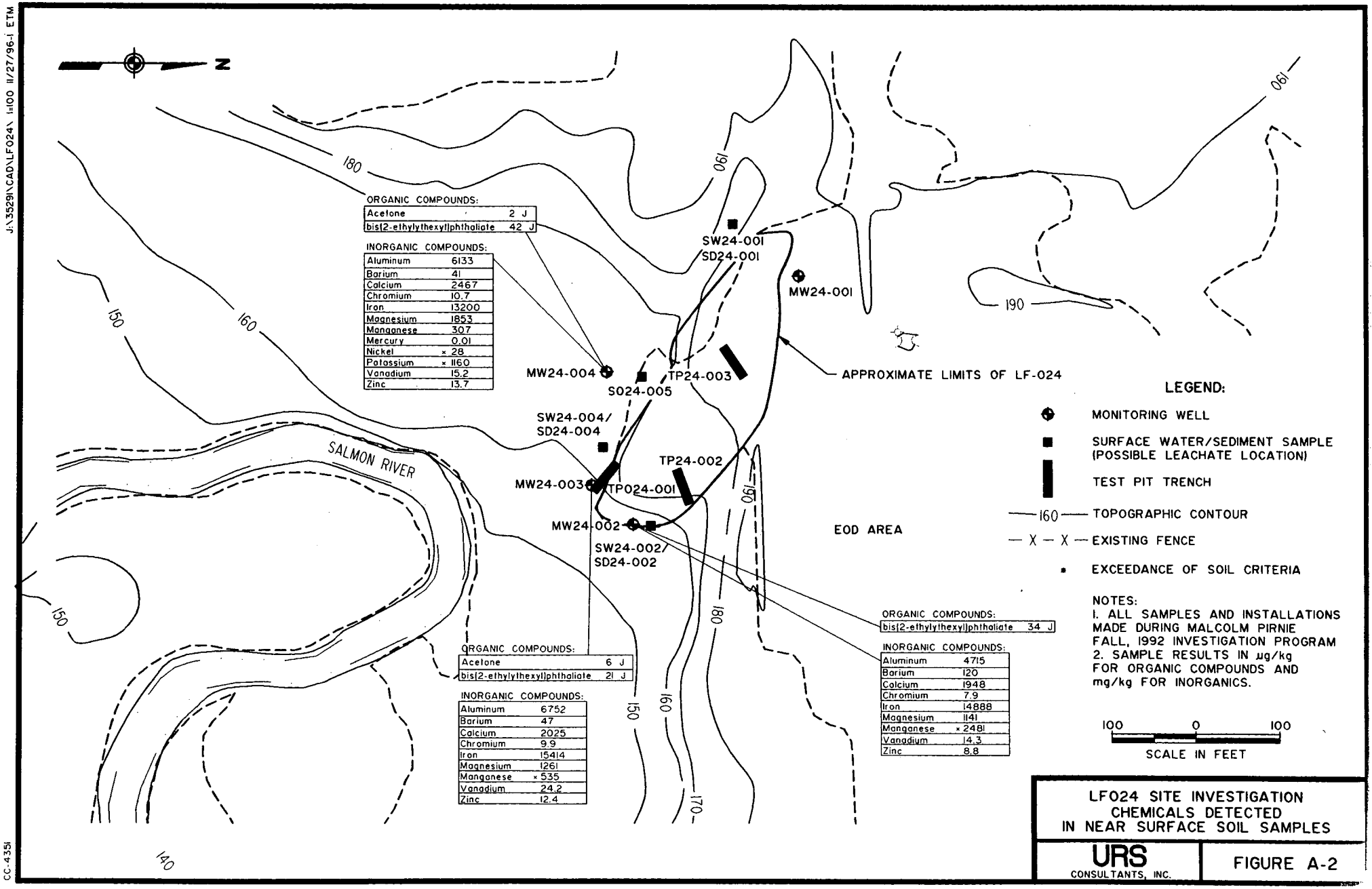

J:\3529\CADD\LF024\ 1:100 11/27/96-I ETM
N
180
190
160
150
170
140
ORGANIC COMPOUNDS:
Acetone 2 J
bis(2-ethylythexyl)phthalate 42 J
INORGANIC COMPOUNDS:
Aluminum 6133
Barium 41
Calcium 2467
Chromium 10.7
Iron 13200
Magnesium 1853
Manganese 307
Mercury 0.01
Nickel x 28
Potassium x 1160
Vanadium 15.2
Zinc 13.7
SW24-001
SD24-001
MW24-001
MW24-004
SO24-005
TP24-003
SW24-004/
SD24-004
TP24-002
MW24-003
TP024-001
MW24-002
SW24-002/
SD24-002
SALMON RIVER
EOD AREA
APPROXIMATE LIMITS OF LF-024
ORGANIC COMPOUNDS:
Acetone 6 J
bis(2-ethylythexyl)phthalate 21 J
INORGANIC COMPOUNDS:
Aluminum 6752
Barium 47
Calcium 2025
Chromium 9.9
Iron 15414
Magnesium 1261
Manganese x 535
Vanadium 24.2
Zinc 12.4
ORGANIC COMPOUNDS:
bis(2-ethylythexyl)phthalate 34 J
INORGANIC COMPOUNDS:
Aluminum 4715
Barium 120
Calcium 1948
Chromium 7.9
Iron 14888
Magnesium 1141
Manganese x 2481
Vanadium 14.3
Zinc 8.8
LEGEND:
MONITORING WELL
SURFACE WATER/SEDIMENT SAMPLE (POSSIBLE LEACHATE LOCATION)
TEST PIT TRENCH
160 TOPOGRAPHIC CONTOUR
X X EXISTING FENCE
EXCEEDANCE OF SOIL CRITERIA
NOTES:
1. ALL SAMPLES AND INSTALLATIONS MADE DURING MALCOLM PIRNIE FALL, 1992 INVESTIGATION PROGRAM
2. SAMPLE RESULTS IN µg/kg FOR ORGANIC COMPOUNDS AND mg/kg FOR INORGANICS.
100 0 100
SCALE IN FEET
LF024 SITE INVESTIGATION
CHEMICALS DETECTED
IN NEAR SURFACE SOIL SAMPLES
URS CONSULTANTS, INC.
FIGURE A-2
CC-4351

TABLE A-3

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN FILL SAMPLES TAKEN DURING TEST TRENCHING

ANALYTE	TBC Values*	LEVEL III			LEVEL IV		
		FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Acetone	200	1 / 6	5	5	0 / 2	ND	ND
Benzoic Acid	2,700	3 / 6	16	30	0 / 1	ND	ND
2-Methylnaphthalene	36,400	0 / 6	ND	ND	1 / 1	1	1
Acenaphthylene	91,000	1 / 6	17	17	0 / 1	ND	ND
Fluorene	50,000	1 / 6	26	26	0 / 1	ND	ND
4-Nitroaniline	--	1 / 6	57	57	0 / 1	ND	ND
Phenanthrene	50,000	2 / 6	22	55	1 / 2	2	2
Anthracene	50,000	1 / 6	28	28	0 / 1	ND	ND
Di-n-butylphthalate	8,100	1 / 6	18	18	0 / 1	ND	ND
Fluoranthene	50,000	2 / 6	34	100	0 / 1	ND	ND
Pyrene	50,000	2 / 6	41	97	1 / 2	2	2
Benzo(a)anthracene	224	2 / 6	20	58	0 / 1	ND	ND
Chrysene	400	2 / 6	31	80	0 / 1	ND	ND
bis(2-Ethylhexyl)phthalate	50,000	4 / 6	96	150	0 / 2	ND	ND
Benzo(b)fluoranthene	1,100	2 / 6	29	76	0 / 1	ND	ND
Benzo(k)fluoranthene	1,100	2 / 6	22	78	0 / 1	ND	ND
Benzo(a)pyrene	61	2 / 6	24	74 [a]	0 / 1	ND	ND
Indeno(1,2,3-cd)pyrene	3,200	2 / 6	19	46	0 / 1	ND	ND
Benzo(g,h,i)perylene	50,000	2 / 6	27	50	0 / 1	ND	ND

All results reported in µg/kg.

ND - Not Detected.

Notes:

* - Unless otherwise noted, To Be Considered (TBC) values are NYSDEC Soil Cleanup Objectives and Cleanup Levels, TAGM HWR-94-4046, January 1994. The listed TBC value is the most stringent regulatory value.

[a] - Exceeds TBC values.

TABLE A-3 (cont'd)

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN FILL SAMPLES TAKEN DURING TEST TRENCHING

ANALYTE	TBC Values	LEVEL III			LEVEL IV		
		FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Aluminum	8510 (SB)	6 / 6	2847	6303	2 / 2	2530	4060
Antimony	12.6 (SB)	0 / 6	ND	ND	1 / 2	15.4 [a]	15.4 [a]
Arsenic	7.5	0 / 6	ND	ND	1 / 2	3	3
Barium	300	2 / 6	43	210	2 / 2	11.4	34.4
Calcium	30200 (SB)	6 / 6	1344	10213	2 / 2	1180	6620
Chromium	19.5 (SB)	6 / 6	3.6	9.9	2 / 2	4.3	7
Cobalt	30	0 / 6	ND	ND	2 / 2	1.9	5.2
Copper	44.1 (SB)	3 / 6	3.6	6	0 / 2	ND	ND
Iron	36700 (SB)	6 / 6	4670	27295	2 / 2	6730	21500
Lead	79.4 (SB)	1 / 6	33	33	2 / 2	2.3	2.8
Magnesium	3340 (SB)	5 / 6	752	5459 [a]	2 / 2	667	3870 [a]
Manganese	474 (SB)	5 / 6	50	5455 [a]	2 / 2	65.1	201
Mercury	0.1	0 / 6	ND	ND	1 / 2	0.17 [a]	0.17 [a]
Nickel	13	2 / 6	6.6	8.6	1 / 2	0.17	0.17
Potassium	929 (SB)	3 / 6	691	1043 [a]	1 / 2	5.7	5.7
Selenium	2	0 / 6	ND	ND	2 / 2	299 [a]	655 [a]
Thallium	ND (SB)	0 / 6	ND	ND	1 / 2	104 [a]	104 [a]
Vanadium	150	5 / 6	6.8	18.1	0 / 2	ND	ND
Zinc	63.4 (SB)	6 / 6	5.7	22	2 / 2	10.4	14
Solids, Total (%W/W)		NA	NA	NA	2 / 2	7.3	16.7

All results reported in mg/kg.

ND - Not Detected.

NA - Not Analyzed.

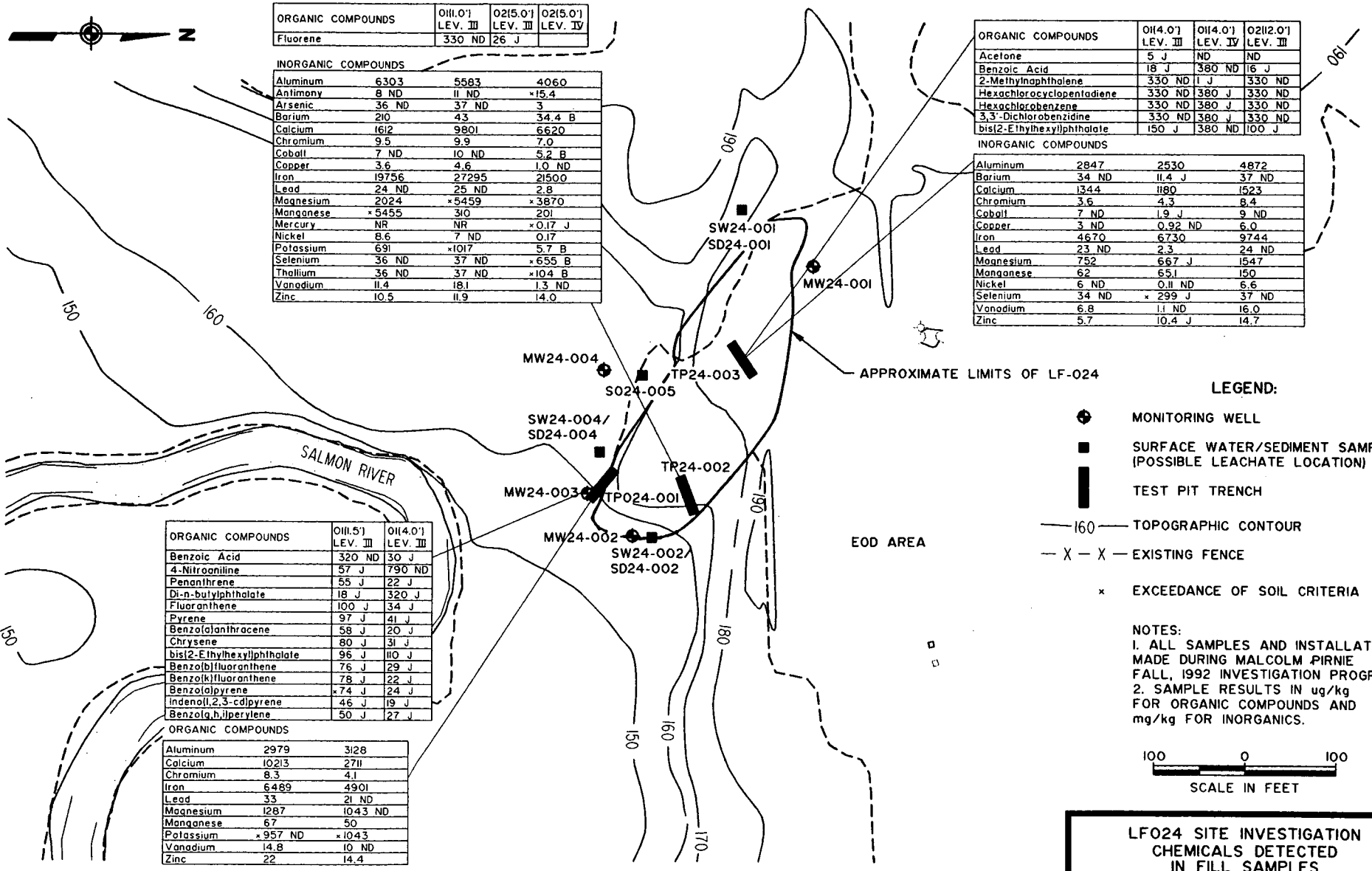
SB - Soil background value.

Notes:

* - Unless otherwise noted, To Be Considered (TBC) values are NYSDEC Soil Cleanup Objectives and Cleanup Levels, TAGM HWR-94-4046, January 1994. Site Background (SB) values for metals were used when less stringent than the regulatory value. Site Background was based on a basewide background study (URS 1995).

[a] - Exceeds TBC values.

J:\3529\CAD\LF024\ 1=100 11/27/96-I ETM



ORGANIC COMPOUNDS	01(1.0') LEV. III	02(5.0') LEV. III	02(5.0') LEV. IV
Fluorene	330 ND	26 J	

INORGANIC COMPOUNDS

Aluminum	6303	5583	4060
Antimony	8 ND	11 ND	×15.4
Arsenic	36 ND	37 ND	3
Barium	210	43	34.4 B
Calcium	1612	9801	6620
Chromium	9.5	9.9	7.0
Cobalt	7 ND	10 ND	5.2 B
Copper	3.6	4.6	1.0 ND
Iron	19756	27295	21500
Lead	24 ND	25 ND	2.8
Magnesium	2024	×5459	×3870
Manganese	×5455	310	201
Mercury	NR	NR	×0.17 J
Nickel	8.6	7 ND	0.17
Potassium	691	×1017	5.7 B
Selenium	36 ND	37 ND	×655 B
Thallium	36 ND	37 ND	×104 B
Vanadium	11.4	18.1	1.3 ND
Zinc	10.5	11.9	14.0

ORGANIC COMPOUNDS	01(4.0') LEV. III	01(4.0') LEV. IV	02(12.0') LEV. III
Acetone	5 J	ND	ND
Benzoic Acid	18 J	380 ND	16 J
2-Methylnaphthalene	330 ND	1 J	330 ND
Hexachlorocyclopentadiene	330 ND	380 J	330 ND
Hexachlorobenzene	330 ND	380 J	330 ND
3,3'-Dichlorobenzidine	330 ND	380 J	330 ND
bis(2-Ethylhexyl)phthalate	150 J	380 ND	100 J

INORGANIC COMPOUNDS

Aluminum	2847	2530	4872
Barium	34 ND	11.4 J	37 ND
Calcium	1344	1180	1523
Chromium	3.6	4.3	8.4
Cobalt	7 ND	1.9 J	9 ND
Copper	3 ND	0.92 ND	6.0
Iron	4670	6730	9744
Lead	23 ND	2.3	24 ND
Magnesium	752	667 J	1547
Manganese	62	65.1	150
Nickel	6 ND	0.11 ND	6.6
Selenium	34 ND	× 299 J	37 ND
Vanadium	6.8	1.1 ND	16.0
Zinc	5.7	10.4 J	14.7

ORGANIC COMPOUNDS	01(1.5') LEV. III	01(4.0') LEV. III
Benzoic Acid	320 ND	30 J
4-Nitroaniline	57 J	790 ND
Penanthrene	55 J	22 J
Di-n-butylphthalate	18 J	320 J
Fluoranthene	100 J	34 J
Pyrene	97 J	41 J
Benzo(a)anthracene	58 J	20 J
Chrysene	80 J	31 J
bis(2-Ethylhexyl)phthalate	96 J	110 J
Benzo(b)fluoranthene	76 J	29 J
Benzo(k)fluoranthene	78 J	22 J
Benzo(a)pyrene	×74 J	24 J
Indeno(1,2,3-cd)pyrene	46 J	19 J
Benzo(g,h,i)perylene	50 J	27 J

ORGANIC COMPOUNDS

Aluminum	2979	3128
Calcium	1023	2711
Chromium	8.3	4.1
Iron	6489	4901
Lead	33	21 ND
Magnesium	1287	1043 ND
Manganese	67	50
Potassium	× 957 ND	× 1043
Vanadium	14.8	10 ND
Zinc	22	14.4

LEGEND:

- MONITORING WELL
- SURFACE WATER/SEDIMENT SAMPLE (POSSIBLE LEACHATE LOCATION)
- TEST PIT TRENCH
- 160 — TOPOGRAPHIC CONTOUR
- — X — X — EXISTING FENCE
- × EXCEEDANCE OF SOIL CRITERIA

NOTES:
1. ALL SAMPLES AND INSTALLATIONS MADE DURING MALCOLM PIRNIE FALL, 1992 INVESTIGATION PROGRAM
2. SAMPLE RESULTS IN ug/kg FOR ORGANIC COMPOUNDS AND mg/kg FOR INORGANICS.

100 0 100
SCALE IN FEET

LF024 SITE INVESTIGATION CHEMICALS DETECTED IN FILL SAMPLES

URS CONSULTANTS, INC.

FIGURE A-3

CC-4349

TABLE A-4

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN SUBSURFACE SOIL SAMPLES FROM BORINGS

ANALYTE	TBC Values*	LEVEL III			LEVEL IV		
		FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Organic Compounds:							
Acetone	200	1 / 2	5	5	1 / 1	11	11
Di-n-butylphthalate	8,100	2 / 2	9	14	0 / 1	ND	ND
Fluoranthene	50,000	1 / 2	16	16	0 / 1	ND	ND
Pyrene	50,000	1 / 2	16	16	0 / 1	ND	ND
bis(2-Ethylhexyl)phthalate	50,000	2 / 2	110	140	0 / 1	ND	ND
Inorganics (metals):							
Aluminum	8,510 (SB)	2 / 2	2723	7151	1 / 1	3090	3090
Barium	300	0 / 2	ND	ND	1 / 1	16.8	16.8
Calcium	30,200 (SB)	1 / 2	1228	1228	1 / 1	955	955
Chromium	19.5 (SB)	2 / 2	3.2	9.4	1 / 1	5.2	5.2
Cobalt	30.0	ND	ND	ND	1 / 1	1.6	1.6
Iron	36,700 (SB)	2 / 2	3813	10250	1 / 1	6540	6540
Lead	79.4 (SB)	ND	ND	ND	1 / 1	2.6	2.6
Magnesium	3,340 (SB)	ND	ND	ND	1 / 1	732	732
Manganese	474 (SB)	2 / 2	52	91	1 / 1	62.4	62.4
Nickel	13	ND	ND	ND	1 / 1	5.2	5.2
Potassium	929 (SB)	ND	ND	ND	1 / 1	424	424
Sodium	520 (SB)	ND	ND	ND	1 / 1	106	106
Vanadium	150	1 / 2	16.8	16.8	1 / 1	9.7	9.7
Zinc	63.4 (SB)	2 / 2	8.1	11.9	1 / 1	9.9	9.9

All organic results reported in µg/kg. All inorganic results reported in mg/kg.

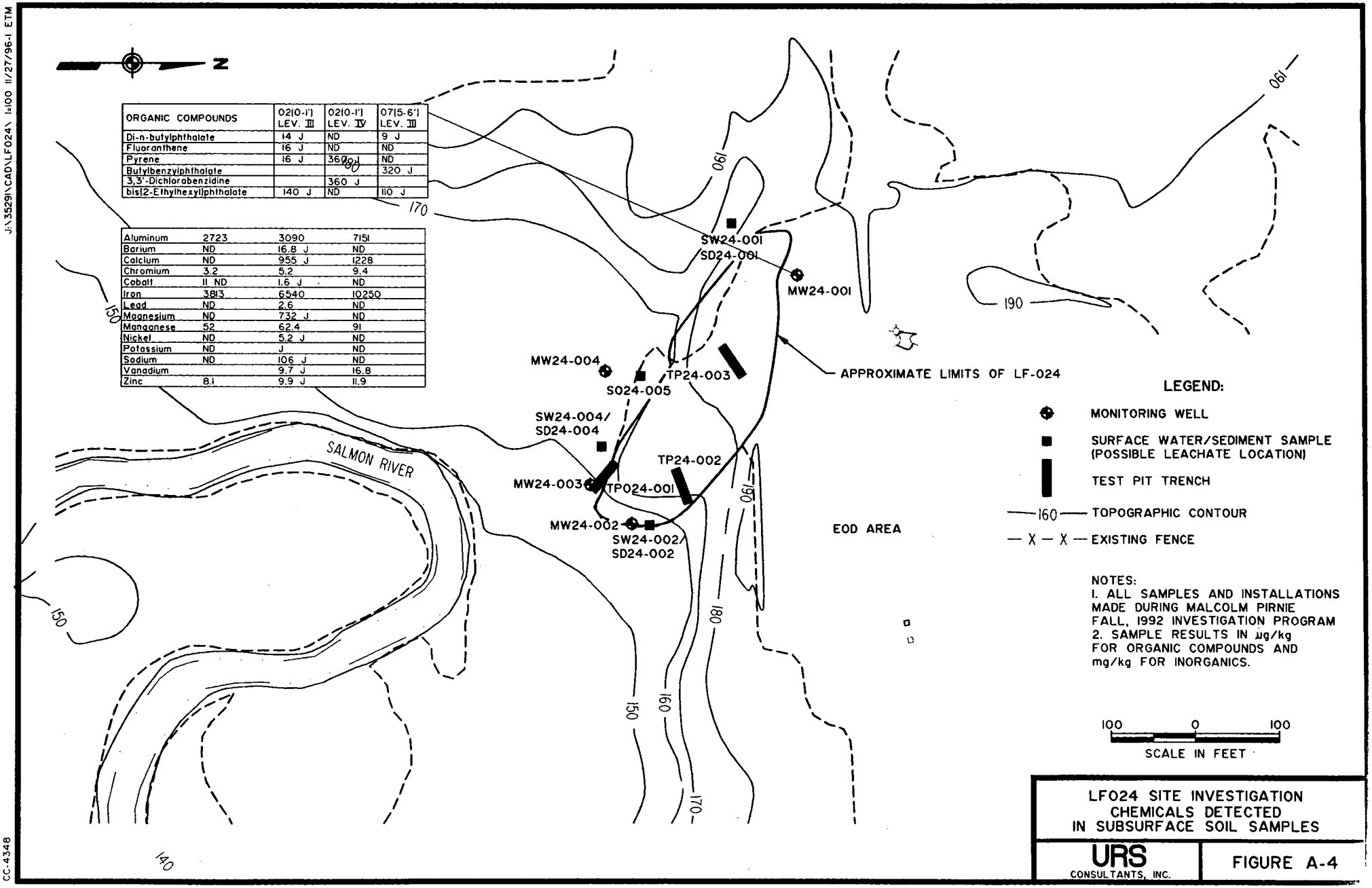
ND - Not Detected.

SB - Soil background value. Based on basewide background study (URS 1995).

Notes:

* - Unless otherwise noted, To Be Considered (TBC) values are NYSDEC Soil Cleanup Objectives and Cleanup Levels, TAGM HWR-94-4046, January 1994. Site Background (SB) values for metals were used when less stringent than the regulatory value. Site Background was based on a basewide background study (URS 1995). The listed TBC value for organics is the most stringent regulatory value.

J:\35291\CAD\LF024\ 1:100 11/27/96-I ETM



ORGANIC COMPOUNDS	02(0-1') LEV. III	02(0-1') LEV. IV	07(5-6') LEV. III
Di-n-butylphthalate	14 J	ND	9 J
Fluoranthene	16 J	ND	ND
Pyrene	16 J	360 J	ND
Butylbenzylphthalate			320 J
3,3'-Dichlorobenzidine		360 J	
bis(2-Ethylhexyl)phthalate	140 J	ND	110 J

Aluminum	2723	3090	7151
Barium	ND	16.8 J	ND
Calcium	ND	955 J	1228
Chromium	3.2	5.2	9.4
Cobalt	11 ND	1.6 J	ND
Iron	3813	6540	10250
Lead	ND	2.6	ND
Magnesium	ND	732 J	ND
Manganese	52	62.4	91
Nickel	ND	5.2 J	ND
Potassium	ND	J	ND
Sodium	ND	106 J	ND
Vanadium		9.7 J	16.8
Zinc	8.1	9.9 J	11.9

LF024 SITE INVESTIGATION
CHEMICALS DETECTED
IN SUBSURFACE SOIL SAMPLES

URS CONSULTANTS, INC.

FIGURE A-4

CC-4348

TABLE A-5

CONSTRUCTION SPOILS LANDFILL(LF-024) - SITE INVESTIGATION
SUMMARY OF ANALYTES DETECTED IN GROUNDWATER
(UNFILTERED SAMPLES)

ANALYTE	ARAR Values*	LEVEL IV		
		FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION
Organic Compounds:				
Methylene Chloride	5	4 / 4	3	3
2-Methylphenol	1	1 / 4	ND	2 [a]
bis(2-Ethylhexyl)phthalate	50	3 / 4	ND	1
Inorganics (metals):				
Aluminum	--	3 / 4	999	109000
Antimony	3	1 / 4	ND	87.6 [a]
Arsenic	25	1 / 4	ND	5.1
Barium	1,000	4 / 4	44	1790 [a]
Beryllium	3	3 / 4	ND	10.3 [a]
Calcium	--	4 / 4	16600	247000
Chromium	50	3 / 4	ND	338 [a]
Cobalt	--	3 / 4	ND	97.5
Copper	200	3 / 4	ND	70.9
Iron	300	4 / 4	1530 [a]	250000 [a]
Lead	15 **	3 / 4	ND	85.9 [a]
Magnesium	35,000	4 / 4	3990	65600 [a]
Manganese	300	4 / 4	37	15100 [a]
Mercury	2	1 / 4	ND	0.71
Nickel	--	3 / 4	ND	232
Potassium	--	4 / 4	1880	19500
Sodium	20,000	4 / 4	1700	31300 [a]
Thallium	4	2 / 4	ND	9.3 [a]
Vanadium	--	3 / 4	ND	189
Zinc	300	3 / 4	ND	2770 [a]
Cyanide	100	2 / 4	ND	80

All results reported in µg/l.

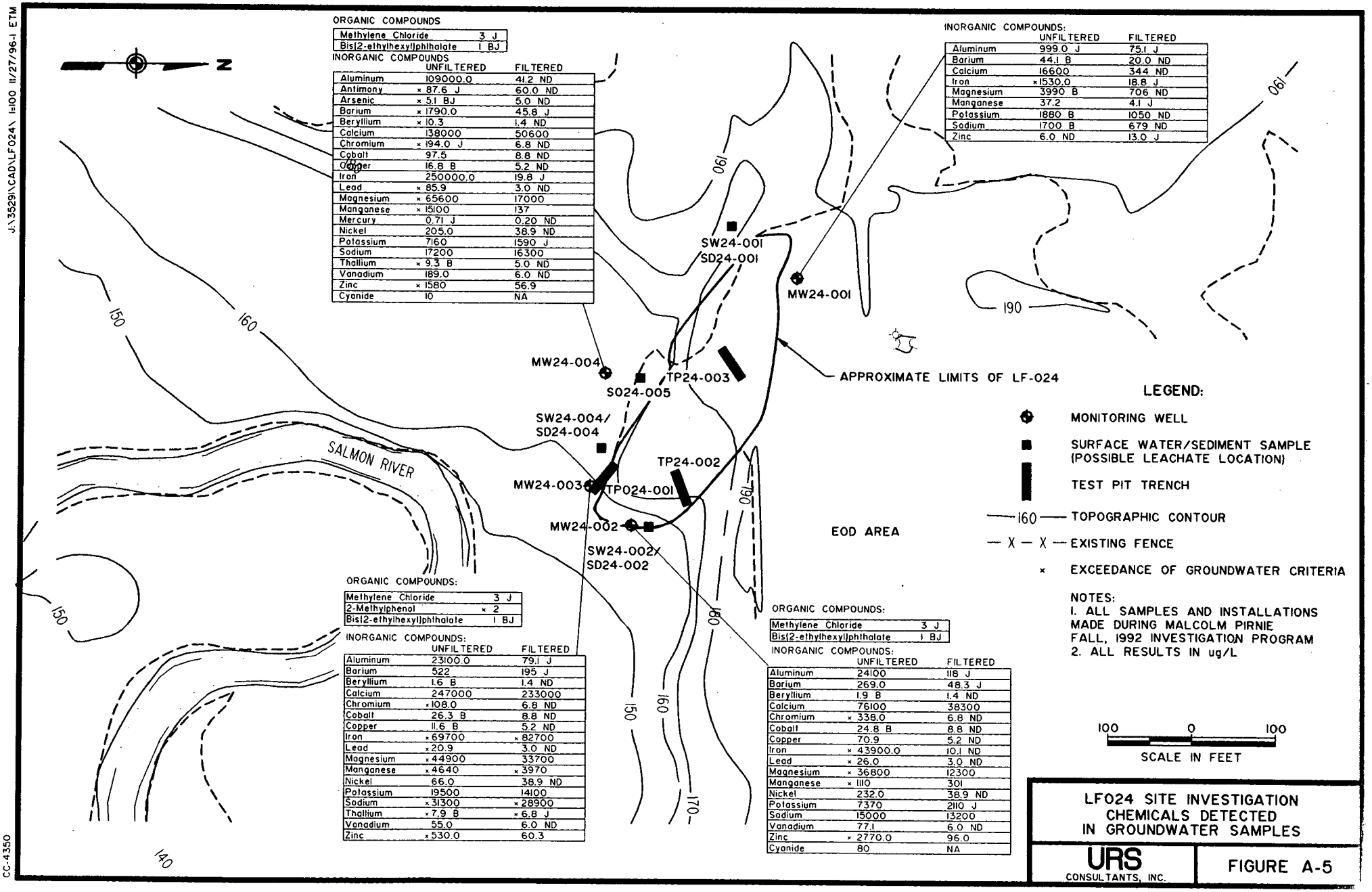
Notes:

* - Unless otherwise noted, the ARAR values are NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, October 1993.
The listed ARAR value is the most stringent regulatory value. Minimum concentrations and non-detects were reported from the upgradient well.

** - EPA Drinking Water Standards 40 CFR 141.

ND - No Detection

[a] - Exceeds ARAR value.


J:\3529\CAD\LF024\ 1=100 11/27/96-1 ETM
CC-4350
N
ORGANIC COMPOUNDS
Methylene Chloride 3 J
Bis(2-ethylhexyl)phthalate 1 BJ
INORGANIC COMPOUNDS
UNFILTERED FILTERED
Aluminum 109000.0 41.2 ND
Antimony x 87.6 J 60.0 ND
Arsenic x 5.1 BJ 5.0 ND
Barium x 1790.0 45.8 J
Beryllium x 10.3 1.4 ND
Calcium 138000 50600
Chromium x 194.0 J 6.8 ND
Cobalt 97.5 8.8 ND
Copper 16.8 B 5.2 ND
Iron 250000.0 19.8 J
Lead x 85.9 3.0 ND
Magnesium x 65600 17000
Manganese x 15100 137
Mercury 0.71 J 0.20 ND
Nickel 205.0 38.9 ND
Potassium 7160 1590 J
Sodium 17200 16300
Thallium x 9.3 B 5.0 ND
Vanadium 189.0 6.0 ND
Zinc x 1580 56.9
Cyanide 10 NA
INORGANIC COMPOUNDS:
UNFILTERED FILTERED
Aluminum 999.0 J 75.1 J
Barium 44.1 B 20.0 ND
Calcium 16600 344 ND
Iron x 1530.0 18.8 J
Magnesium 3990 B 706 ND
Manganese 37.2 4.1 J
Potassium 1880 B 1050 ND
Sodium 1700 B 679 ND
Zinc 6.0 ND 13.0 J
ORGANIC COMPOUNDS:
Methylene Chloride 3 J
2-Methylphenol x 2
Bis(2-ethylhexyl)phthalate 1 BJ
INORGANIC COMPOUNDS:
UNFILTERED FILTERED
Aluminum 23100.0 79.1 J
Barium 522 195 J
Beryllium 1.6 B 1.4 ND
Calcium 247000 233000
Chromium x 108.0 6.8 ND
Cobalt 26.3 B 8.8 ND
Copper 11.6 B 5.2 ND
Iron x 69700 x 82700
Lead x 20.9 3.0 ND
Magnesium x 44900 33700
Manganese x 4640 x 3970
Nickel 66.0 38.9 ND
Potassium 19500 14100
Sodium x 31300 x 28900
Thallium x 7.9 B x 6.8 J
Vanadium 55.0 6.0 ND
Zinc x 530.0 60.3
ORGANIC COMPOUNDS:
Methylene Chloride 3 J
Bis(2-ethylhexyl)phthalate 1 BJ
INORGANIC COMPOUNDS:
UNFILTERED FILTERED
Aluminum 24100 118 J
Barium 269.0 48.3 J
Beryllium 1.9 B 1.4 ND
Calcium 76100 38300
Chromium x 338.0 6.8 ND
Cobalt 24.8 B 8.8 ND
Copper 70.9 5.2 ND
Iron x 43900.0 10.1 ND
Lead x 26.0 3.0 ND
Magnesium x 36800 12300
Manganese x 1110 301
Nickel 232.0 38.9 ND
Potassium 7370 2110 J
Sodium 15000 13200
Vanadium 77.1 6.0 ND
Zinc x 2770.0 96.0
Cyanide 80 NA
SW24-001
SD24-001
MW24-001
MW24-004
SO24-005
TP24-003
SW24-004/
SD24-004
TP24-002
MW24-003
TP024-001
MW24-002
SW24-002/
SD24-002
APPROXIMATE LIMITS OF LF-024
EOD AREA
SALMON RIVER
140
150
160
170
190
LEGEND:
MONITORING WELL
SURFACE WATER/SEDIMENT SAMPLE (POSSIBLE LEACHATE LOCATION)
TEST PIT TRENCH
160 TOPOGRAPHIC CONTOUR
X X EXISTING FENCE
x EXCEEDANCE OF GROUNDWATER CRITERIA
NOTES:
1. ALL SAMPLES AND INSTALLATIONS MADE DURING MALCOLM PIRNIE FALL, 1992 INVESTIGATION PROGRAM
2. ALL RESULTS IN ug/L
100 0 100
SCALE IN FEET
LF024 SITE INVESTIGATION
CHEMICALS DETECTED
IN GROUNDWATER SAMPLES
URS CONSULTANTS, INC.
FIGURE A-5

APPENDIX B

DECLARATION OF CONCURRENCE

APPENDIX C

PUBLIC MEETING TRANSCRIPTS

APPENDIX D

RESPONSIVENESS SUMMARY